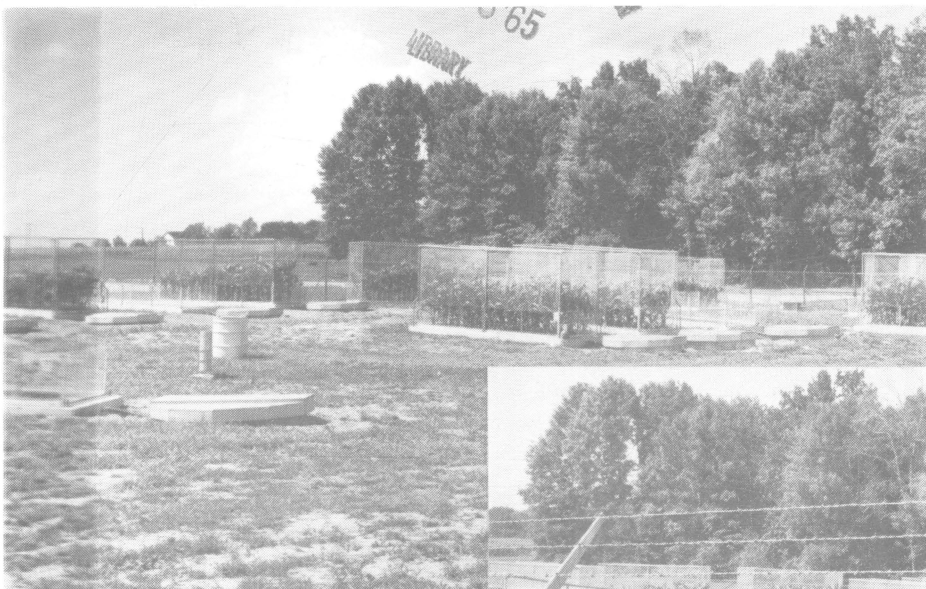
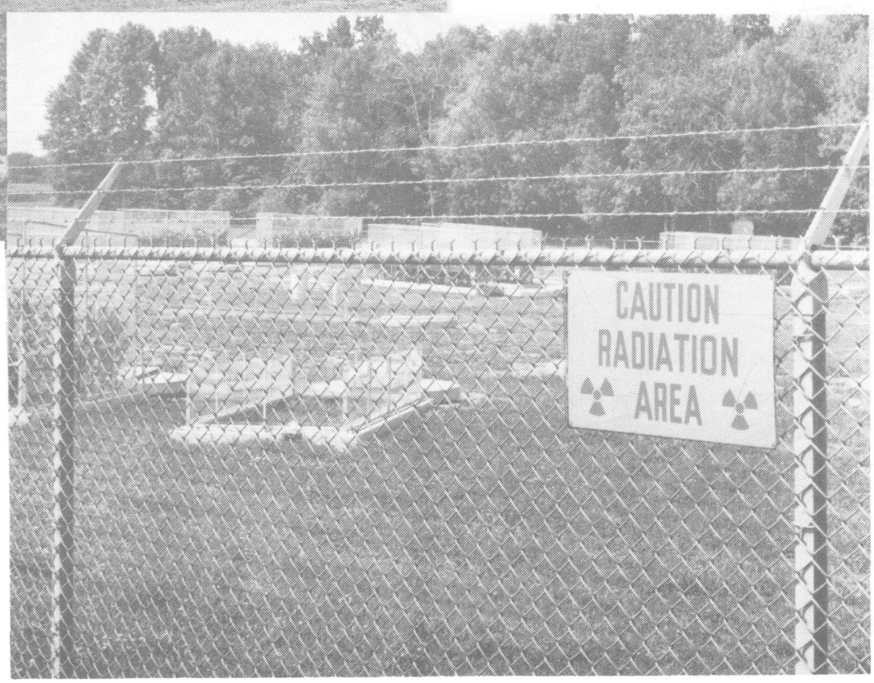
RESEARCH CIRCULAR 141

OCTOBER 1965

A Facility for Conducting Field Investigations with Radioactive Materials

F. HAGHIRI, G. E. MERVA, AND N. HOLOWAYCHUK





Ohio Agricultural Research and Development Center

WOOSTER, OHIO

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AGDEX $\frac{100}{518}$

10-65-1M

A Facility for Conducting Field Investigations with Radioactive Materials*

F. HAGHIRI, G. E. MERVA, AND N. HOLOWAYCHUK

INTRODUCTION

A knowledge of the processes influencing the disposition of any airborne contaminant that falls on the land surface should contribute to a better understanding of the circumstances leading to the removal, accumulation, or concentration of such material. The fate of a contaminant such as radioactive fallout, which is not subject to microbial decomposition, will be determined by such processes as soil fixation, plant uptake, leaching, runoff, and erosion by water and wind. A quantitative evaluation of the effects of these processes as they may operate in or on a segment of landscape should make it possible to predict or at least estimate the extent of removal, accumulation, or concentration of such materials at a particular site.

Some inferences as to the probable extent of influence of each of the processes on the disposition of radioactive contaminants, such as Sr^{90}, can be drawn from the various investigations reported.

A general review of conclusions in various publications has been presented by Frere *et al* (1). Many of these investigations, however, have been conducted under laboratory or greenhouse conditions. They have been directed largely to studies of the various soil properties and soil-plant relations as these may affect fixation and plant uptake of isotopes under laboratory or greenhouse conditions. Some data has also been obtained on the removal of certain isotopes by water erosion. However, to measure the extent of removal or accumulation of Sr^{90} by each of the several processes operating collectively, an integrated approach with field plots exposed to elements of weather under natural conditions is essential.

Field investigations are being conducted to evaluate the disposition of Sr^{90} influenced by the several processes operating simultaneously. Field microplots, .002 acre in size, were designed and constructed to provide isolation of the soil of each plot and of the vegetation grown. Facilities were provided for isolation, collection, and measurement of runoff, erosion, and leachate water from each plot. Analyses of the various materials removed from each plot and of the soil provide a measure of the Sr^{90} losses or retention under different kinds of vegetation and different soil management systems on one soil with similar topography.

This bulletin describes the design and physical installation of the highly controlled field micro-runoff plots and the facilities for collecting and measuring runoff water, eroded materials, and leachate water.

*Based on work performed under Contract No. AT(11-1)-414, with the U.S. Atomic Energy Commission.

DESCRIPTION OF FIELD RESEARCH AREA

The field research area occupies a small isolated watershed, about 1.5 acres in size, at the Ohio Agricultural Research and Development Center's East Badger site. It is located about 6 miles east of Wooster, Ohio, and 2 miles north of Apple Creek, Ohio.

The general area is gently rolling or undulating with a high proportion under cultivation. The small watershed has gently sloping topography, with slope gradients of the plots ranging from 3 to 5 percent. The area has been under cultivation but was in mixed grasses when this investigation was initiated.

The soil of the micro-plots is a moderately eroded Canfield silt loam. It is a moderately well drained (3) Gray Brown Podzolic soil derived from slightly calcareous loam till of Wisconsin age. Canfield silt loam, in undisturbed conditions, is strongly to very strongly acid in the upper part of the profile. Where this soil has been cultivated, however, liming and probably other treatments and disturbances have tended to render it less acid.

One of the important properties of this soil is the presence of a fragipan (B_x horizon 16-45 inches) in the lower subsoil. This relatively dense horizon reduces appreciably its permeability to air and water. It also restricts considerably the deeper penetration and distribution of root systems.

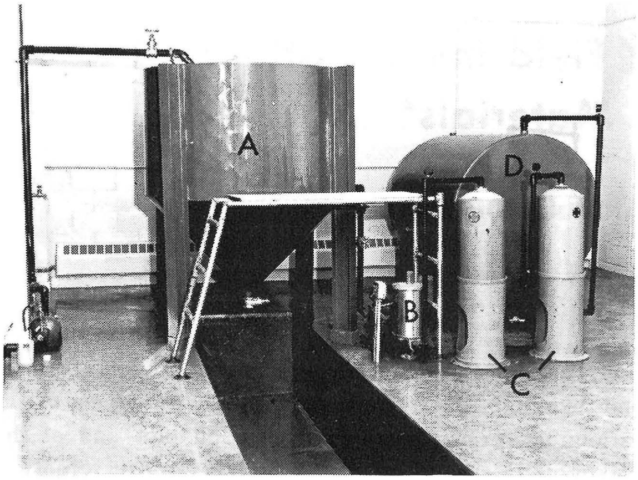


Fig. 1.–Decontamination facilities for the removal of Sr^{90} from runoff and eroded materials.

GENERAL DESCRIPTION AND OPERATION OF FIELD FACILITIES

The watershed was isolated from the surrounding area by enclosing it with an 8-foot cyclone chain-linked fence. The enclosed area contains 32 micro-runoff plots. Thirty of these plots are used to study the disposition and distribution of Sr^{90} in the soil, plant, runoff, and leachate. The remaining two plots (Drawing 129, plots 1 and 2) were used to calibrate the spray equipment used to apply Sr^{90} and to test soil sampling procedures.

Fifteen of the experimental plots are "hot plots" which have been treated (sprayed) with Sr^{90}. The remaining plots are "cold plots" which have been kept untreated to serve as control (Drawing 129).

The lower end of each plot is connected by a flume pipe to a 300-gallon catchment basin where runoff water and eroded materials are collected after each rainfall. Each catchment basin contains an electrically operated pendulum runoff sampler (Drawing 126). Catchment basins for the hot plots are connected to a sump which is connected to a 10,000-gallon underground tank for temporary storage of contaminated runoff water and eroded materials (Drawing 130). Catchment basins for the cold plots are directly connected to field tiles outside the enclosure (Drawing 131).

To collect leachate from the plots, a copper tube drain outlet was installed at the lower end of each plot just above the fragipan horizon. The drain outlet from each plot is extended into a leachate cellar (Drawing 133). The leachate cellar where leachates are collected is located at the lower end of the watershed. After quantitative measurement, the leachates are released into a sump and then automatically pumped into the underground storage tank.

Since water and sediments in the underground storage tank are contaminated with Sr^{90}, the removal of Sr^{90} is essential prior to discharge of the water. For this purpose, a decontamination shelter was constructed (Drawing 114) near the underground storage tank. The decontamination shelter is divided into two sections: a "cold room" and a "hot room". The cold room contains heat and power facilities, buffer zones and shower, non-radioactive storage, and cold sample processing areas. The hot room contains a decontamination system, hot waste storage, and hot sample processing areas.

The decontamination system (2) is shown in Figure 1. It is composed of four units: a coagulation tank (A), filter (B), cation-exchange resin columns (C), and check tank (D).

Contaminated runoff water and eroded materials from the 10,000-gallon underground storage tank are pumped into the 500-gallon hopper bottom coagulation tank (Drawing 124). While the materials are being transferred, coagulant is added to coagulate the colloidal particles present in the suspension.

The flocs are allowed to settle in the conical portion of the coagulation tank. After complete settling of the flocs, the clear supernatant is pumped through a column of filters and first and second cation-exchange resin columns. The effluent is stored temporarily in the check tank (Drawing 124).

Before the stored water in the check tank is discharged, water samples are taken for radio assay. The sediments and coagulants deposited in the conical portion of the coagulation tank are transferred through a gate valve into a 55-gallon drum located in a 3-foot deep pit (Drawing 114). Here they are treated as radioactive waste. The material flow from the runoff plots is shown in Figure 2.

FIELD FACILITIES

Micro-Runoff Plots

General description: Isolated micro-runoff plots, .002 acre in size (15.84 x 5.5 ft.), were designed and installed. These plots are composed of undisturbed soil isolated from the surrounding areas by four connecting concrete walls lined with polyethylene and fiberglass sheets. Fiberglass lining was used to prevent plant roots from coming in contact with the concrete walls.

For minimum splash interchange, plots were shielded with a plexiglas splash guard. In addition to the splash guard, tall growing plants such as corn

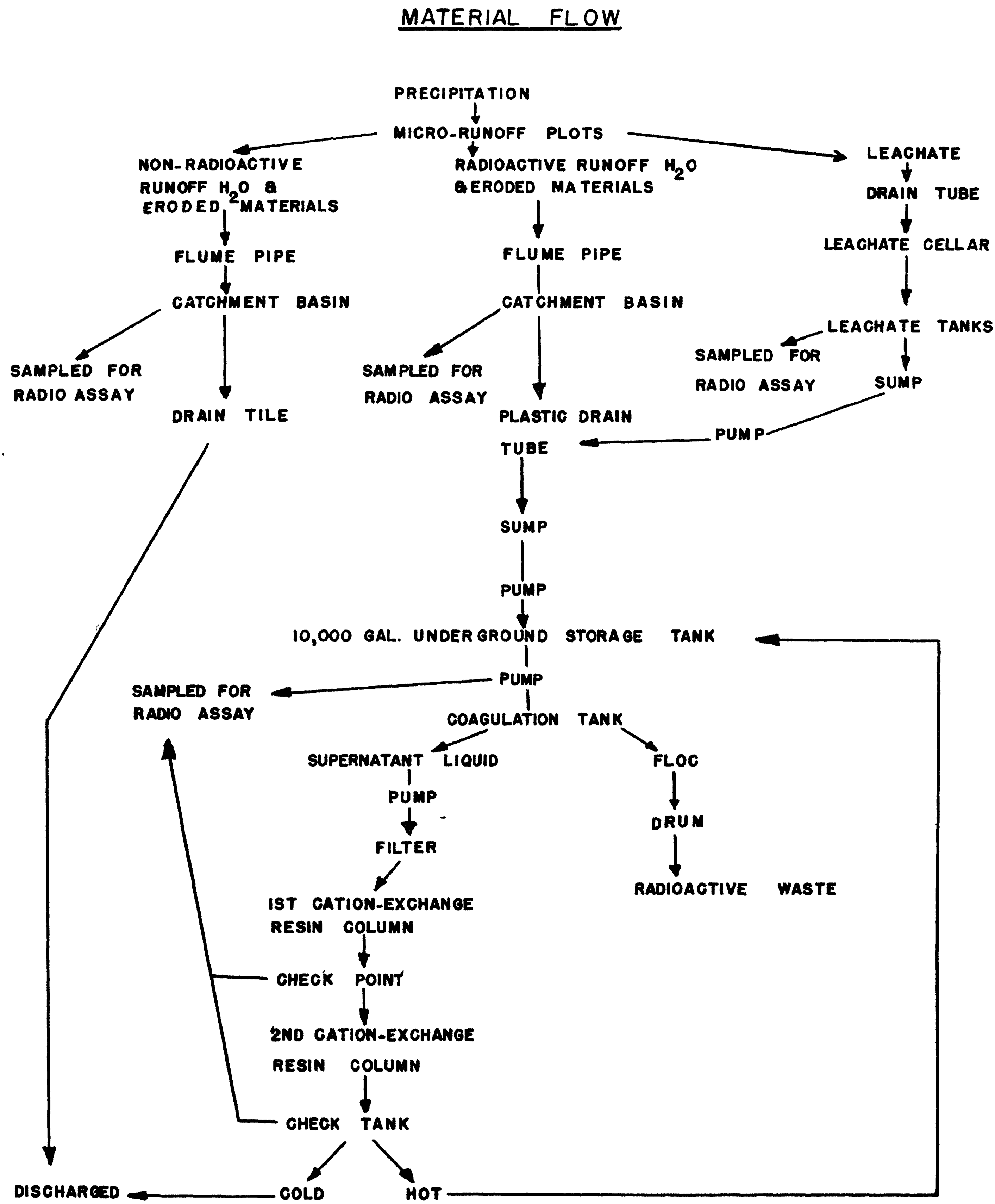


Fig. 2.–Material flow from runoff plots.

are protected by a metal screen on top of the plexiglas splash guard surrounding the plots. At the lower end of each plot, a collection flume for runoff and eroded sediments was installed.

Construction: Carefully mapped areas were selected to serve as experimental runoff plots. A trench approximately 4 feet deep was excavated around the plot (Drawing 100). A ledge was cut into the lower face of the plot just above the fragipan horizon and 1-inch copper drain tubing perforated with 1/8-inch holes was inserted to collect leachate (See Section B-B, Drawing 100).

The polyethylene liner was unrolled around the soil block and the fiberglass was placed around the top 12 inches of the soil block. The reinforcing mesh was cut and lowered into the trench and the forms were checked for elevation. The copper drain was connected to the soil block through the trench and the concrete walls were poured and vibrated (See Section A-A, Drawing 100).

The top plate (Drawing 101) was assembled with the top plate bolts in place and lowered into the wet concrete. One-inch galvanized pipes which serve as a foundation for plant shields were inserted into the concrete and the concrete was finished and allowed to set (See Section A-A, Drawing 100). After the concrete was set, the top plate was unbolted and removed and the forms were disassembled. The concrete was allowed to set for 1 month and then painted.

Gaskets were then cut and the top plate, plexiglas frames (Drawing 101), and flume plate (Drawing 105) were installed. The plexiglas splash guard (Drawing 102) was fastened to the top frames. The collection flumes (Drawing 104) were cut and fitted in each plot and rain guards (Drawing 106) were installed on the lower end of the plots. After the plots were spiked with Sr^{90}, plant shields (Drawing 103) were placed around plots where tall growing plants such as corn were to be grown.

Catchment Basins

General description: The catchment basin is a 320-gallon tank located at the lower end of each micro-runoff plot. Runoff water and eroded materials are channeled from the plot to the catchment basin through a flume pipe. A runoff sampling device, an electrically operated pendulum runoff sampler (Drawing 126, 127, and 128), is located in the basin to collect approximately 2 percent of the total runoff. The 2 percent liquid is a representative sample of the total runoff which is used for Sr^{90} assay.

The catchment basin is drained from the center of the basin through a stainless steel drain pipe. The drain is controlled by means of a valve outside of the basin. For quantitative measurement of runoff, each catchment basin is calibrated individually.

Structurally, the basin is composed of concrete and steel with wood and galvanized metal cover. The basin cover is gasketed to prevent precipitation from entering the basin.

Basins are provided with two electrical services. One service is continuous to provide power to operate the pendulum runoff sampler and the other service is thermostatically controlled to operate a heat lamp in the basin when the temperature is below freezing.

Construction: The catchment basin (Drawing 107) location was staked out and excavated with a backhoe to a proper depth. The center of the basin was located and form stakes were driven to the proper elevation. The form (Drawing 108) was placed on the form stakes and the stainless steel drain pipe was positioned and staked to remain rigid. Crushed bank-run gravel was then dumped into the form to the proper elevation. The reinforcing mesh was fitted into the form and the basin stakes were driven to the desired elevation. The basin was placed on the form stakes to check the elevations and then removed and welded along the lap to prevent water leakage.

Concrete was poured into the form and vibrated. Then a spherical contour was formed by using the strike off board (Drawing 108). The basin was lowered into the concrete and the concrete was finished by hand. After sufficient time for curing, the catchment basins were painted with rubber base concrete and epoxy enamel. The pendulum runoff samplers were installed in the basins and the covers (Drawing 109) were placed over the basins.

The cold catchment basins drain into 4-inch field tile drain lines (Drawing 107) which are connected to a 6-inch tile main at the north end of the enclosure (Drawing 131).

The hot catchment basins drain into 2-inch flexible plastic lines (Drawing 107). These lines originate at the outlet of the catchment basins and terminate at the sump next to the underground storage tank (Drawing 130).

Leachate Collection Cellar

The leachate cellar is located at the lower end of the experimental site. The copper tube leachate outlet of each plot is connected to the leachate cellar by 1-inch plastic pipe (Drawing 133). The pipes are laid in feeder trenches, with six to eight lines in a trench.

The leachate from each plot drains into a corresponding 100-liter tank located in the leachate cellar. After sampling and volumetric measurement, the leachates are drained into a small sump. Here the leachates are pumped into a hot drain line (Drawing 130) and subsequently into the sump and underground storage tank.

Sump and Storage Unit

General description: The sump and storage unit, with a capacity of 10,000 gallons, is located at the lower end of the experimental site. The water enters the sump by gravity and is transferred into the storage unit by a pump. The unit is designed so that if the pump should fail, the sump would fill with water and the water would overflow into the storage unit. Since this condition is not desirable, the sump is equipped with two automatic pumps If one should fail, the other will operate.

Construction: The sump and storage tank unit was designed, the plans (Drawings 110 and 111) were submitted for bids, and the unit was built by contract. The specific considerations for constructing such a unit were that the unit:

1. Must be located in an area so that runoff, eroded materials, and leachate will drain by gravity.
2. Must be located in close proximity to the decontamination facility.
3. Must be constructed so no surface water will enter the unit.
4. Must have sufficient capacity to store two 6-inch runoffs from the treated plots.
5. Must be waterproof and watertight.
6. Must have access for visual inspection of the contents.
7. Must contain appurtenances for intake and withdrawal of contaminated water.

Decontamination Shelter

The decontamination shelter is located at the extreme northeast end of the experimental site (Drawing 131). Structurally, it is a steel frame building with concrete block walls and partitions. The roof is metal, insulated with fiberglass, and the exterior block walls are insulated with poured zonolite. The floor plan of the shelter is shown in Drawing 114.

Water and Electrical Facilities

Water is supplied to the experimental area from a 167-foot deep well located directly north of the enclosure (Drawing 131). The well is equipped with a 1 h.p. submersible pump which is connected to a 320-gallon pressure tank. Water leaves the pumphouse in a 2-inch galvanized steel main which is divided into three services (Drawing 131).

Primary electrical facilities originate in the power room of the decontamination shelter from a 200-ampere main switchbox and subsequently through individual circuit breakers. Cell wiring within the building is in conduit. All power within the building is connected to a 15 K.V.A. standby generator which goes into operation automatically if the primary electrical power fails. Power is supplied to the experimental site through 50-ampere circuits. Electrical lines from the main switchbox to various parts of the experimental areas are shown in Drawing 132.

CONCLUSION

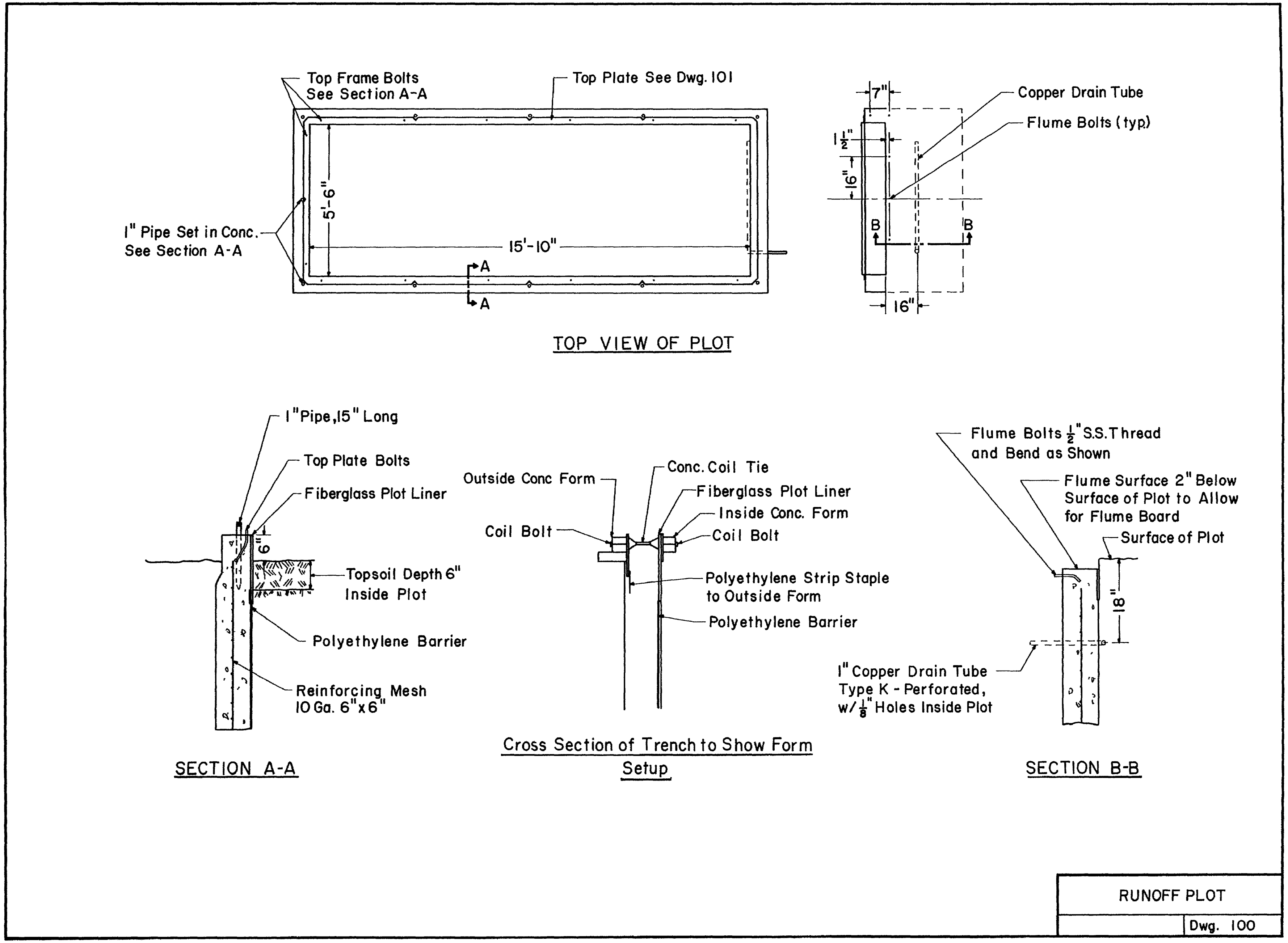
Installation of the field facility was completed in June 1962 and it has been in continuous operation. The entire system has been operating satisfactorily as anticipated. Facilities of this nature are suitable for field investigations with radioactive materials and also can be used for other materials such as herbicides.

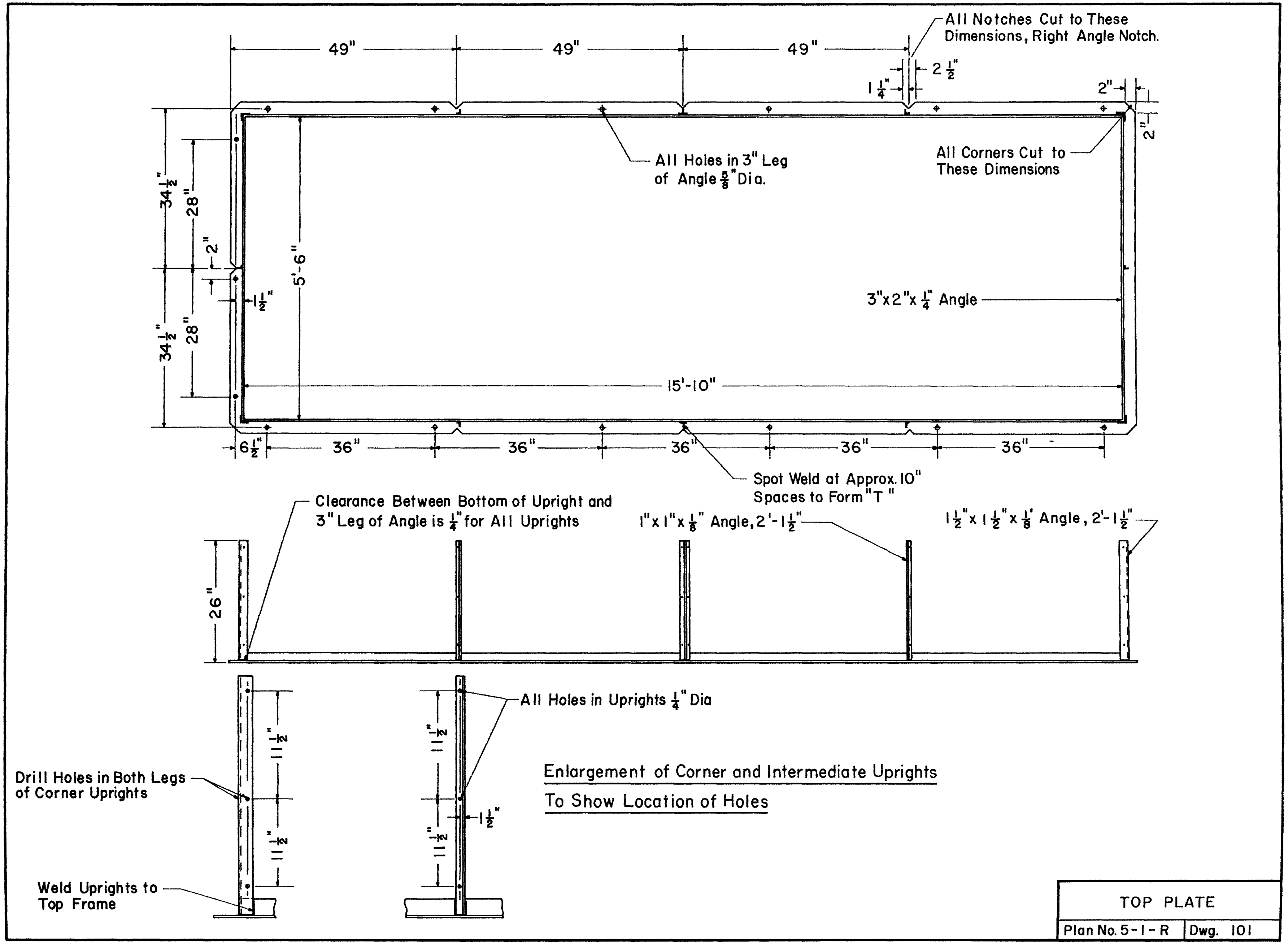
REFERENCES

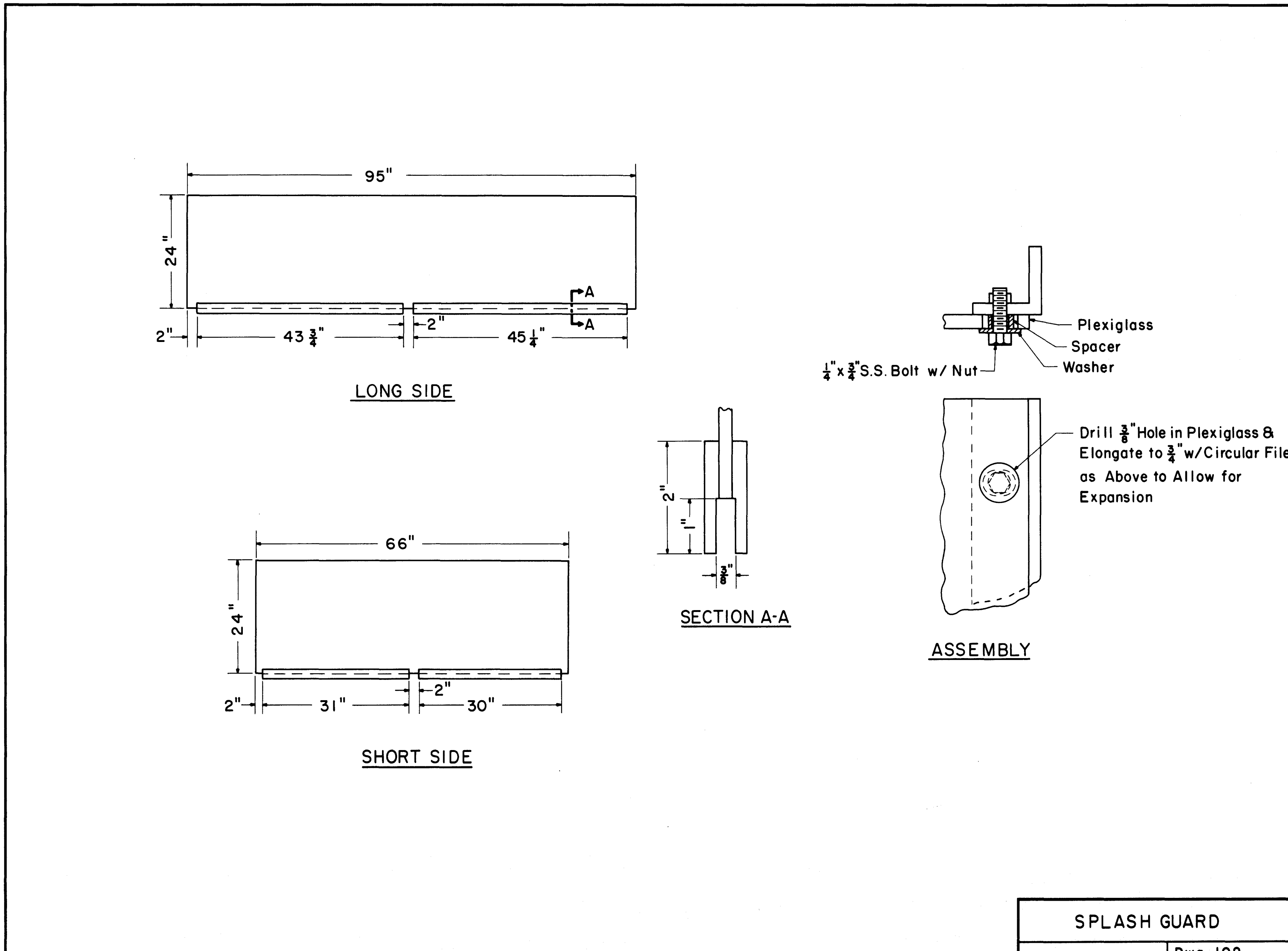
1. Frere, M. H., R. G. Menzel, K. H. Larson, Roy Overstreet, and R. F. Reitemeier. 1963. The Behavior of Radioactive Fallout in Soils and Plants. National Acad. of Sci. NRC Pub. 1092.

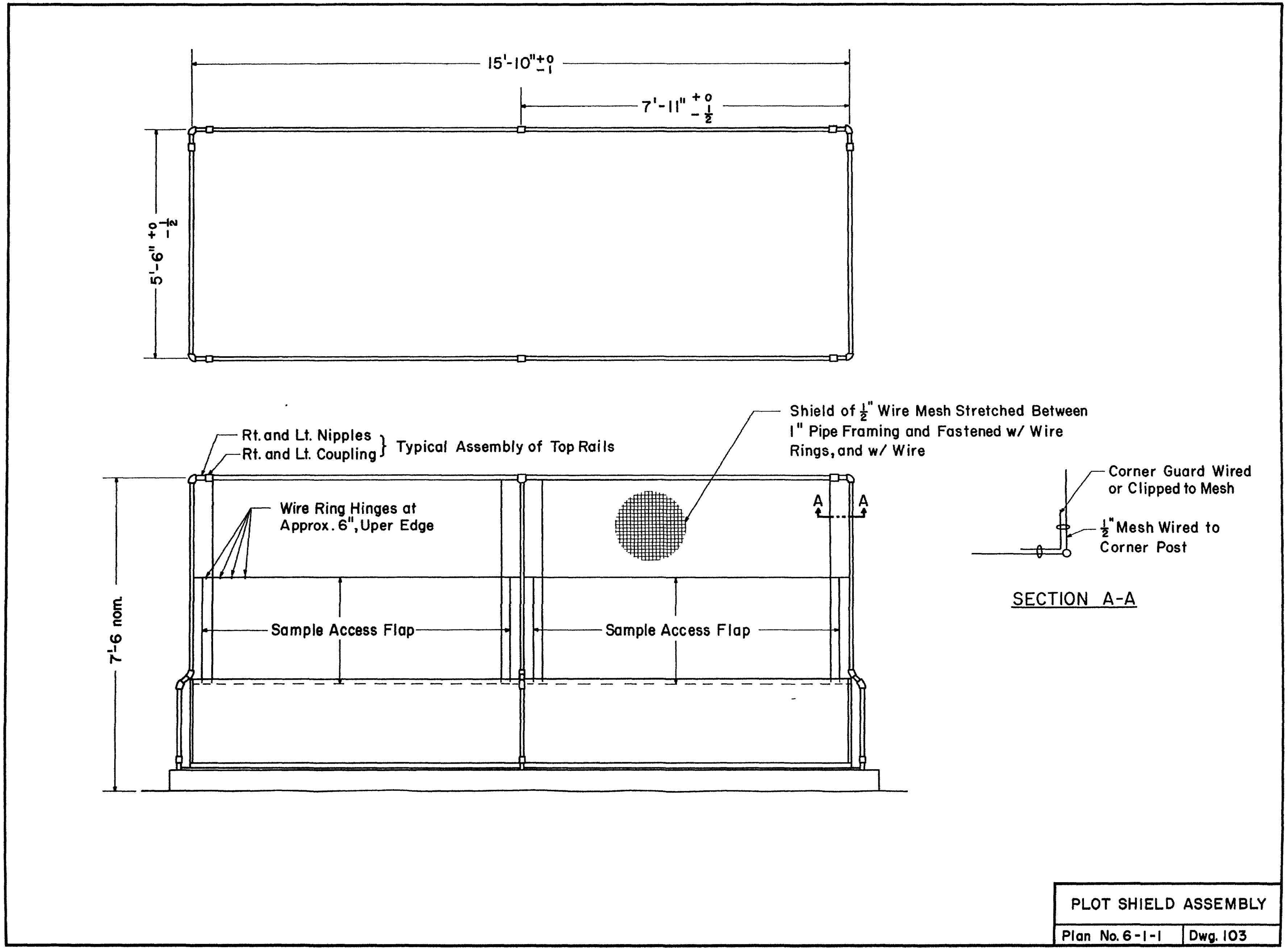
2. Haghiri, F. and G. E. Merva. 1964. A Decontamination Device for the Removal of Radioactive Strontium from Water. Soil Sci. Soc. Amer. Proc. 28: 132.

3. Soil Survey Staff. 1951. Soil Survey Manual. U.S.D.A. Handbook 18, Govt. Printing Office, Washington, D. C.

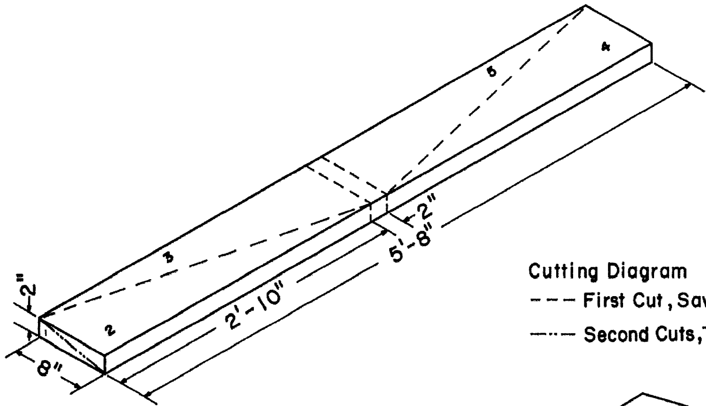

Top Frame Bolts See Section A-A
Top Plate See Dwg. 101
1" Pipe Set in Conc. See Section A-A
5'-6"
15'-10"
A
A
7"
Copper Drain Tube
Flume Bolts (typ.)
1½"
16"
B
B
16"
TOP VIEW OF PLOT
1" Pipe, 15" Long
Top Plate Bolts
Fiberglass Plot Liner
6"
Topsoil Depth 6" Inside Plot
Polyethylene Barrier
Reinforcing Mesh 10 Ga. 6"x6"
SECTION A-A
Outside Conc Form
Conc. Coil Tie
Fiberglass Plot Liner
Inside Conc. Form
Coil Bolt
Coil Bolt
Polyethylene Strip Staple to Outside Form
Polyethylene Barrier
Cross Section of Trench to Show Form Setup
Flume Bolts ½" S.S. Thread and Bend as Shown
Flume Surface 2" Below Surface of Plot to Allow for Flume Board
Surface of Plot
18"
1" Copper Drain Tube Type K - Perforated, w/ ⅛" Holes Inside Plot
SECTION B-B
RUNOFF PLOT
Dwg. 100


All Notches Cut to These Dimensions, Right Angle Notch.
49"
49"
49"
$2\frac{1}{2}$"
$1\frac{1}{4}$"
2"
2"
All Holes in 3" Leg of Angle $\frac{5}{8}$" Dia.
All Corners Cut to These Dimensions
$34\frac{1}{2}$"
28"
2"
$1\frac{1}{2}$"
5'-6"
$34\frac{1}{2}$"
28"
3"x2"x$\frac{1}{4}$" Angle
15'-10"
$6\frac{1}{2}$"
36"
36"
36"
36"
36"
Spot Weld at Approx. 10" Spaces to Form "T"
Clearance Between Bottom of Upright and 3" Leg of Angle is $\frac{1}{4}$" for All Uprights
1"x1"x$\frac{1}{8}$" Angle, 2'-$1\frac{1}{2}$"
$1\frac{1}{2}$"x$1\frac{1}{2}$"x$\frac{1}{8}$" Angle, 2'-$1\frac{1}{2}$"
26"
All Holes in Uprights $\frac{1}{4}$" Dia
$11\frac{1}{2}$"
$11\frac{1}{2}$"
$11\frac{1}{2}$"
$11\frac{1}{2}$"
$1\frac{1}{2}$"
Drill Holes in Both Legs of Corner Uprights
Weld Uprights to Top Frame
Enlargement of Corner and Intermediate Uprights
To Show Location of Holes
TOP PLATE
Plan No. 5-1-R
Dwg. 101


95"
24"
2"
43 3/4"
2"
45 1/4"
A
A
LONG SIDE
66"
24"
2"
31"
2"
30"
SHORT SIDE
2"
1"
3/8"
SECTION A-A
Plexiglass
Spacer
Washer
1/4" x 3/4" S.S. Bolt w/ Nut
Drill 3/8" Hole in Plexiglass & Elongate to 3/4" w/Circular File, as Above to Allow for Expansion
ASSEMBLY
SPLASH GUARD
Dwg. 102



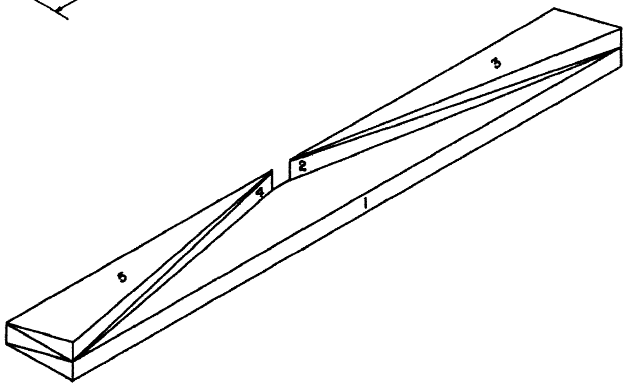
15'-10" +0 −1
7'-11" +0 −½
5'-6" +0 −½
Rt. and Lt. Nipples
Rt. and Lt. Coupling
Typical Assembly of Top Rails
Shield of ½" Wire Mesh Stretched Between 1" Pipe Framing and Fastened w/ Wire Rings, and w/ Wire
Wire Ring Hinges at Approx. 6", Uper Edge
A
A
7'-6 nom.
Sample Access Flap
Sample Access Flap
Corner Guard Wired or Clipped to Mesh
½" Mesh Wired to Corner Post
SECTION A-A
PLOT SHIELD ASSEMBLY
Plan No. 6-1-1
Dwg. 103



Cutting Diagram

--- First Cut, Save Pc. 1

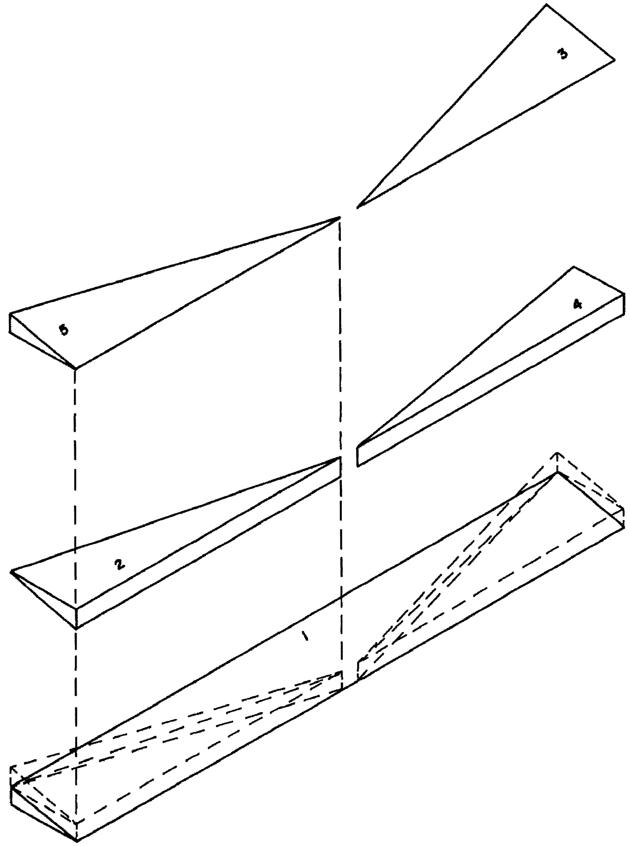
—··— Second Cuts, Through Pc.2



VIEW OF ASSEMBLED FLUME FROM INTAKE SIDE

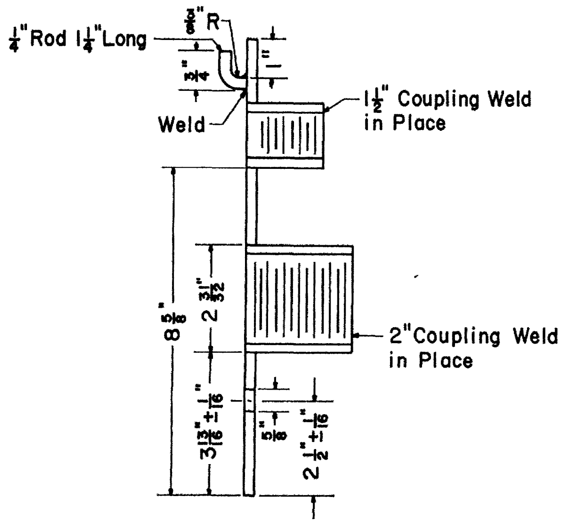
NOTES:

To be Constructed from Treated Lumber (Rough O.K.)
Glue and Nail.

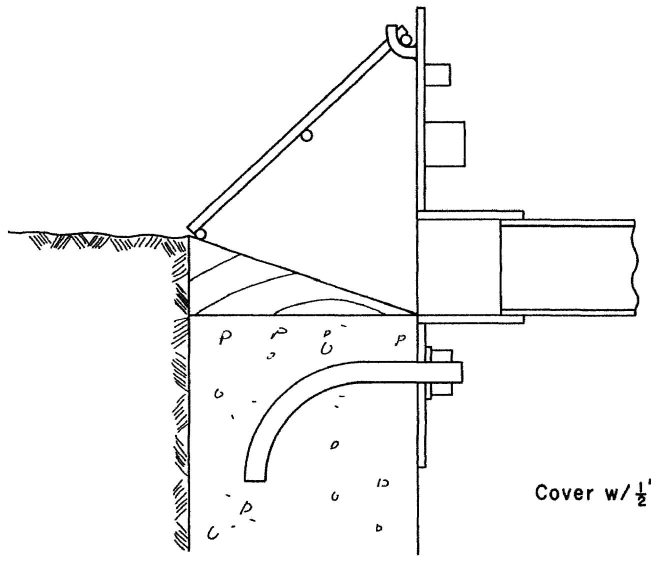


COLLECTION FLUME ASSEMBLY

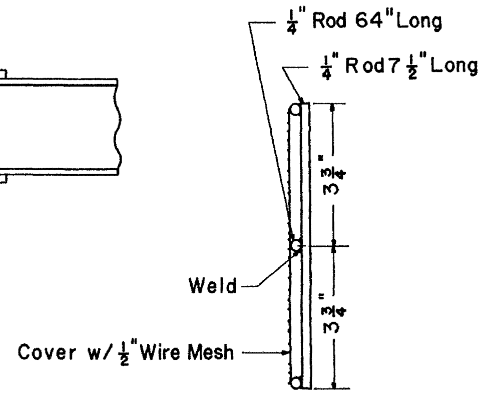
COLLECTION FLUME	
	Dwg. 104



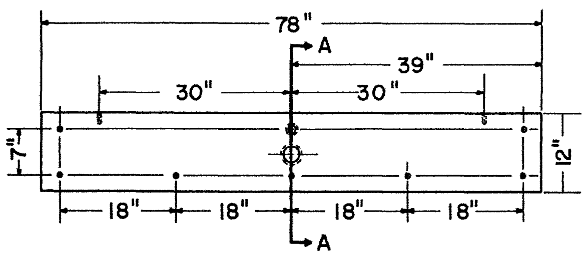
SECTION A-A



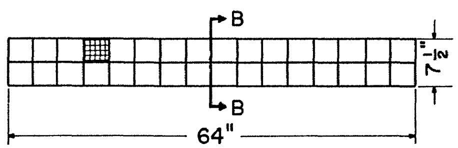
Cross Section of Flume Assembly



SECTION B-B

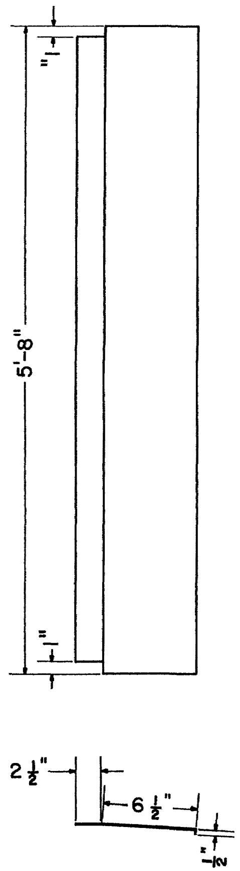


FLUME PLATE

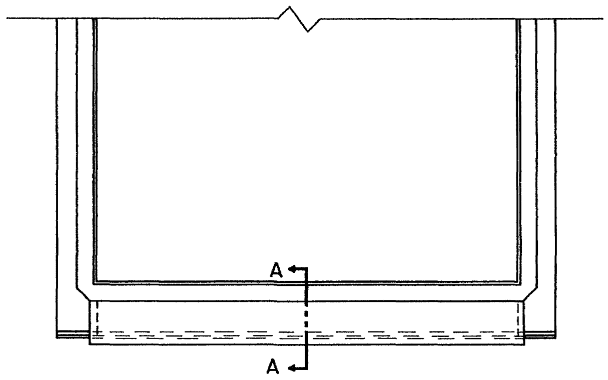


FLUME GUARD

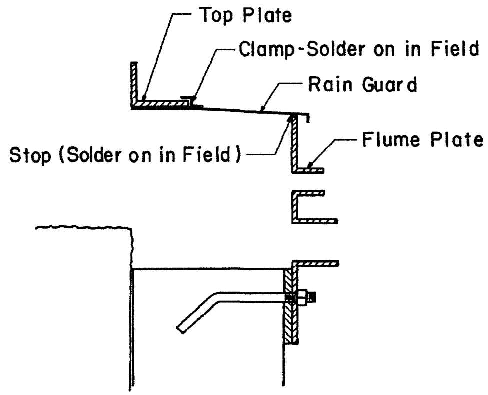
FLUME PLATE & ASSEMBLY	
Plan No. 7-1-R	Dwg. 105



RAIN GUARD LAYOUT

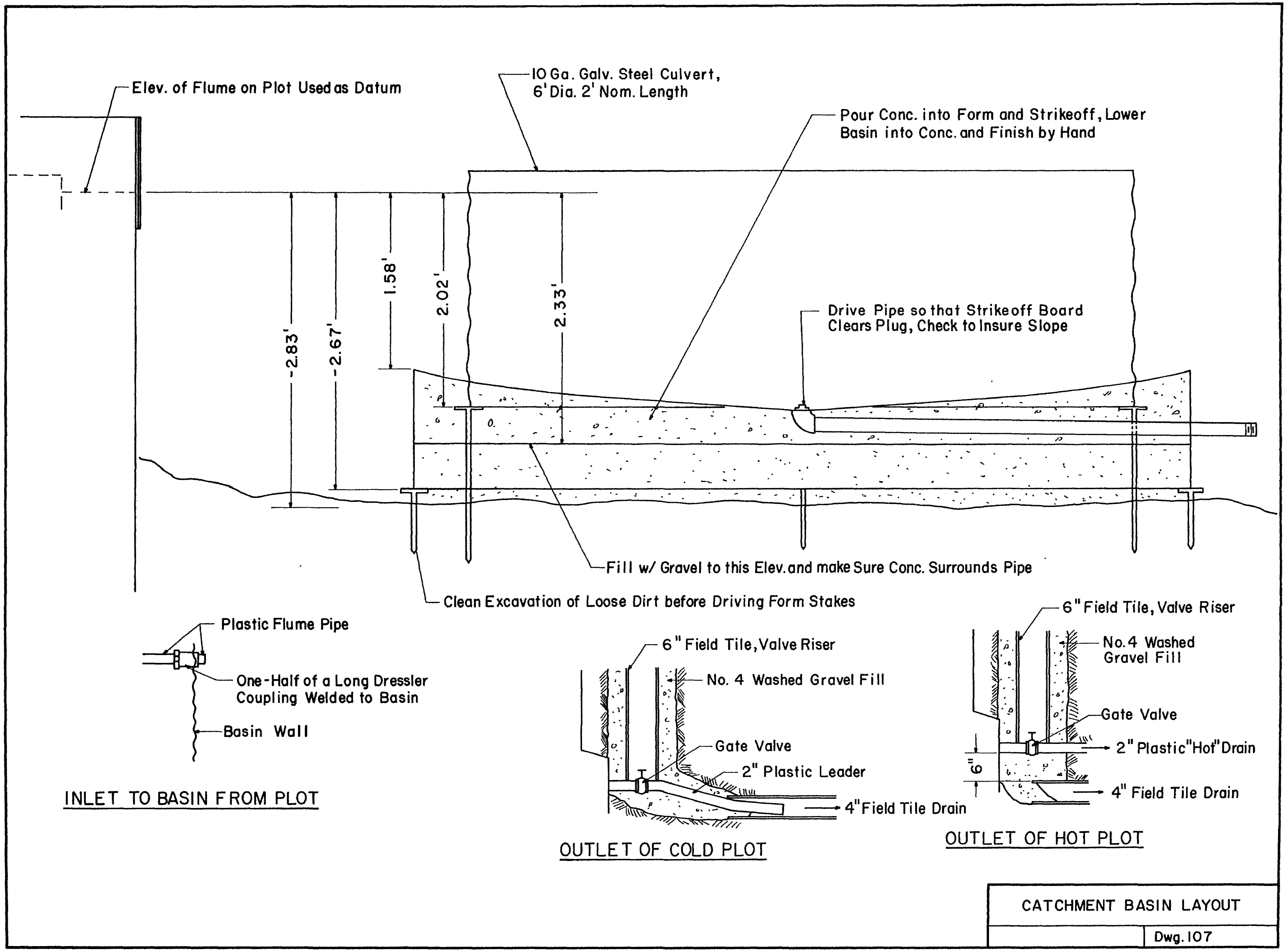


TOP VIEW, FLUME END OF PLOT SHOWING RAIN GUARD IN PLACE

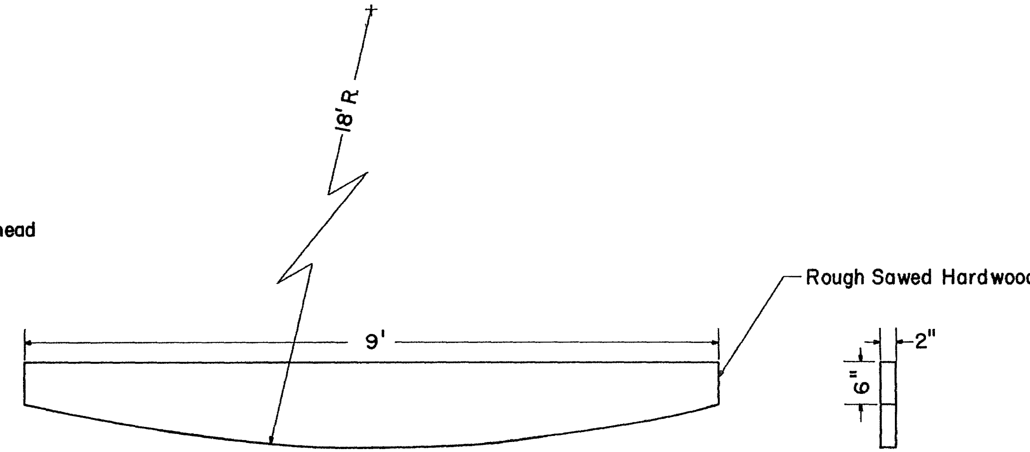


SECTION A-A

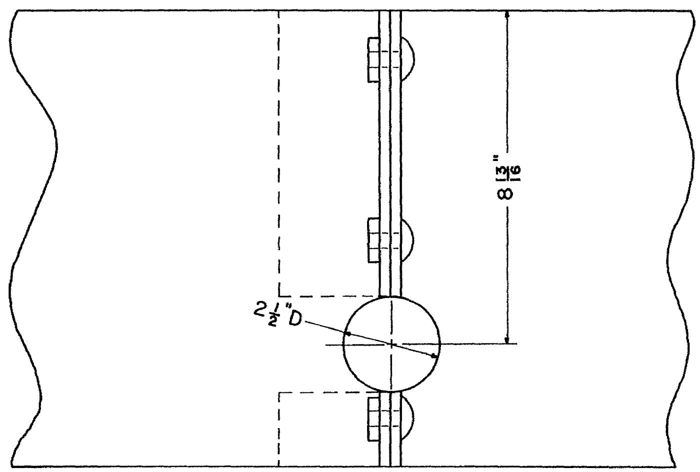
RAIN GUARD	
Plan 7-3-1	Dwg. 106


Elev. of Flume on Plot Used as Datum
10 Ga. Galv. Steel Culvert,
6' Dia. 2' Nom. Length
Pour Conc. into Form and Strikeoff, Lower
Basin into Conc. and Finish by Hand
-2.83'
-2.67'
1.58'
2.02'
2.33'
Drive Pipe so that Strikeoff Board
Clears Plug, Check to Insure Slope
Fill w/ Gravel to this Elev. and make Sure Conc. Surrounds Pipe
Clean Excavation of Loose Dirt before Driving Form Stakes
Plastic Flume Pipe
One-Half of a Long Dressler
Coupling Welded to Basin
Basin Wall
INLET TO BASIN FROM PLOT
6" Field Tile, Valve Riser
No. 4 Washed Gravel Fill
Gate Valve
2" Plastic Leader
4" Field Tile Drain
OUTLET OF COLD PLOT
6" Field Tile, Valve Riser
No. 4 Washed
Gravel Fill
Gate Valve
2" Plastic "Hot" Drain
6"
4" Field Tile Drain
OUTLET OF HOT PLOT
CATCHMENT BASIN LAYOUT
Dwg. 107

NOTE:
Shoe Curved Surface with $\frac{1}{8}$" x 1" Strap Iron Fastened Every 6" w/ No. 10, 1$\frac{1}{4}$" Flathead Wood Screws, Cntr Snk

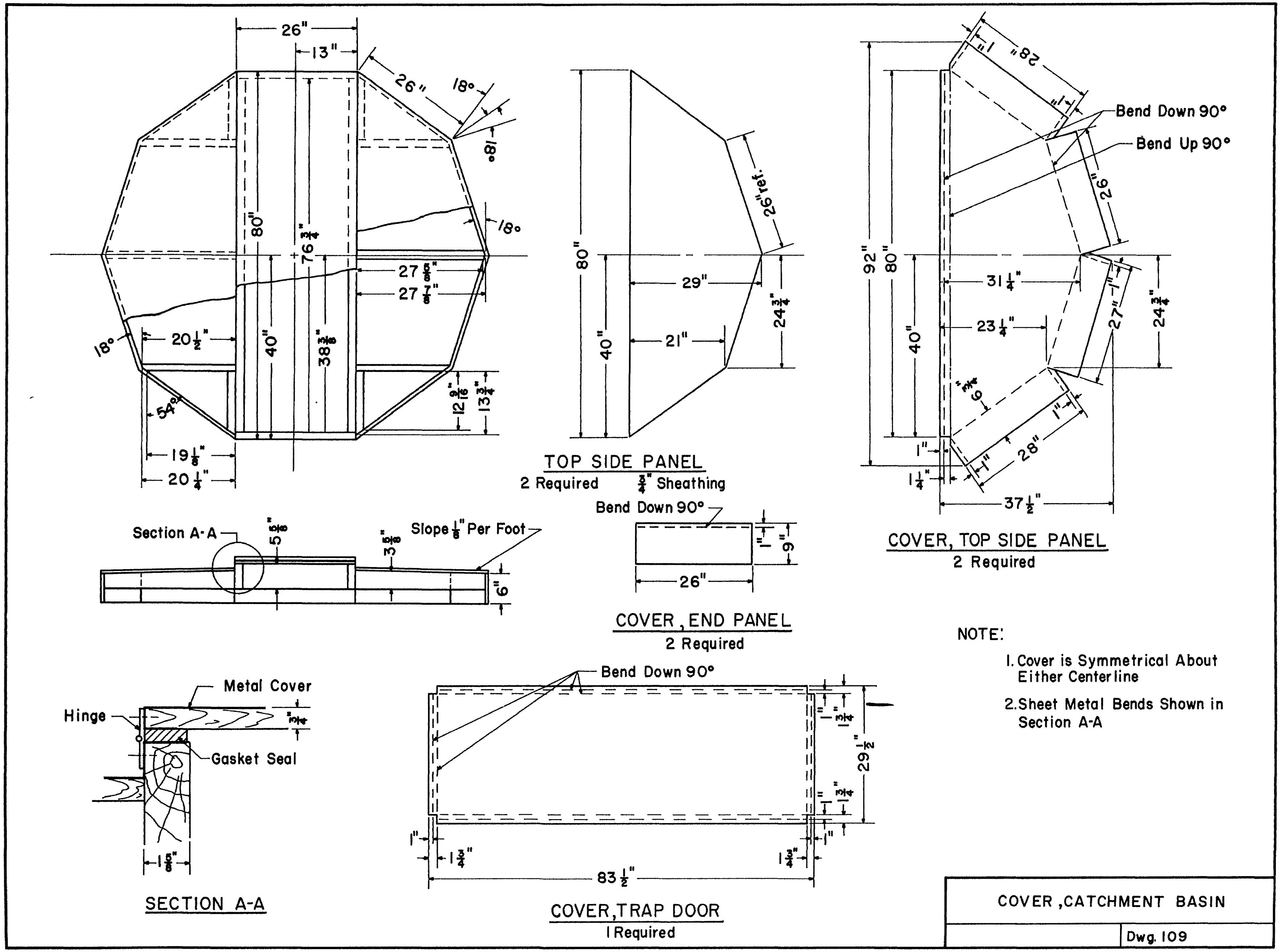


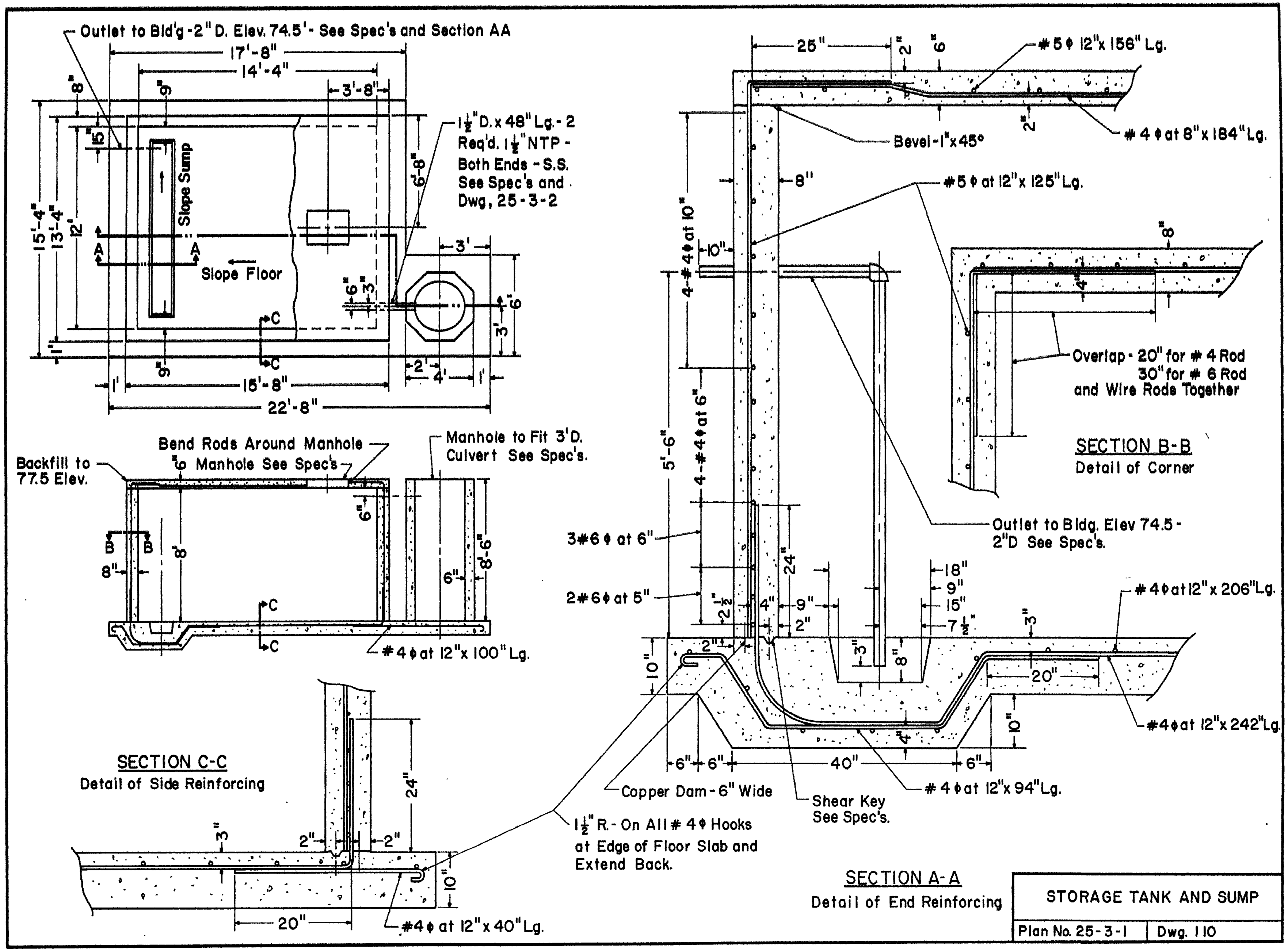
STRIKE OFF BOARD



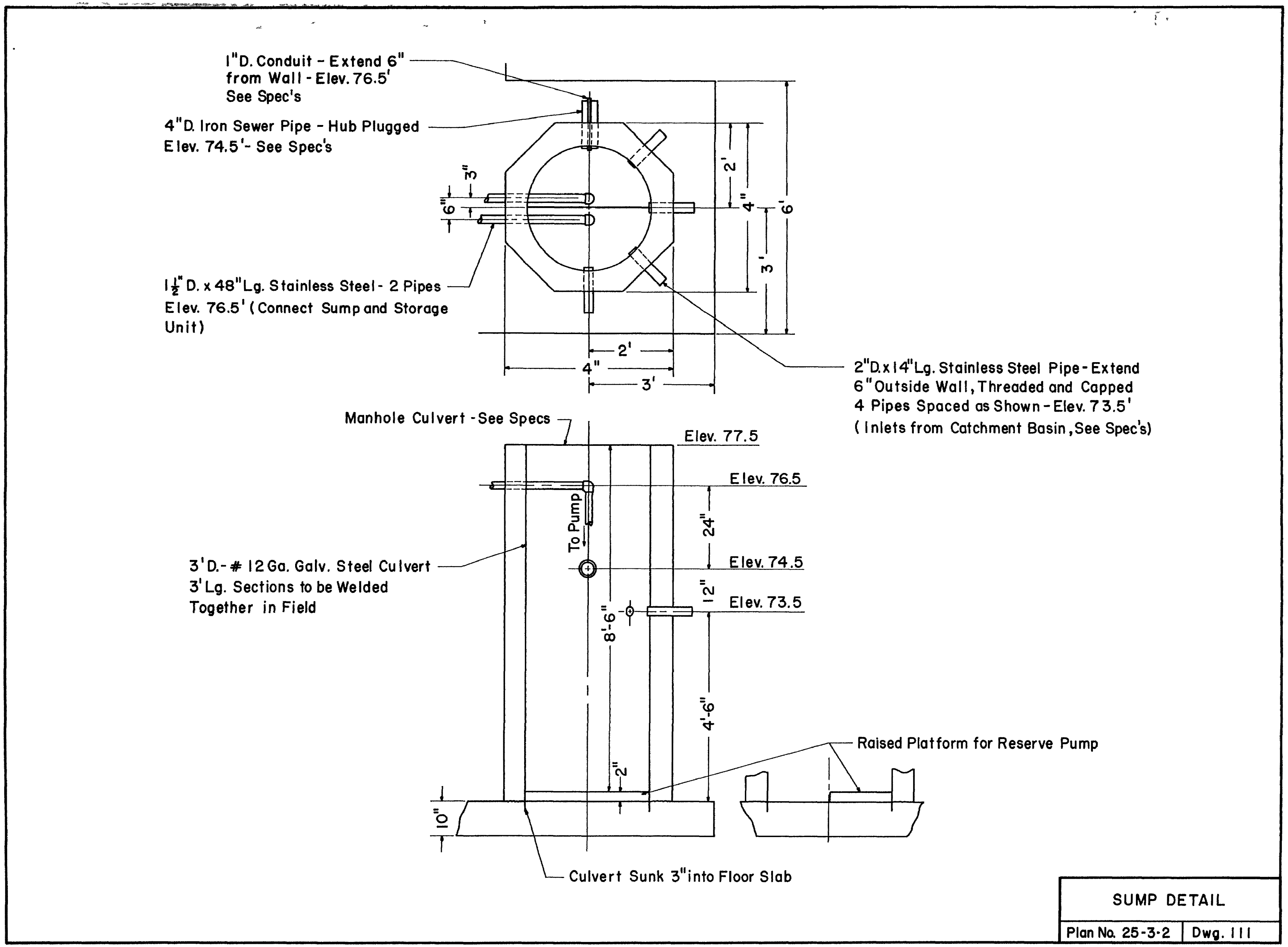
Section of 7" Dia. Connecting Band for Catchment Basin Form Showing Cutout for S.S. Pipe.

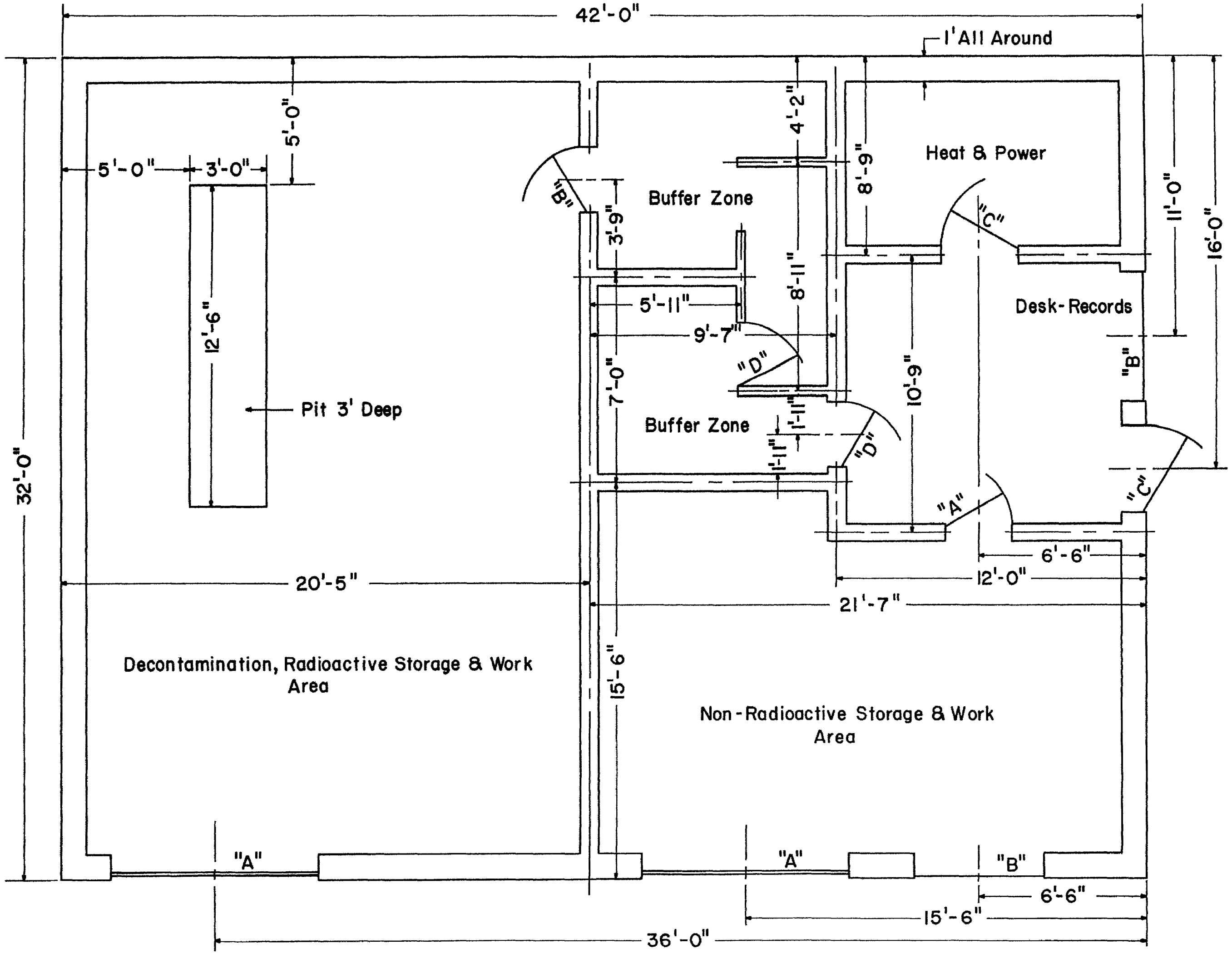
CATCHMENT BASIN FORM DETAILS	
Plan No. 11-3	Dwg. 108


Section A-A
Slope 1/8" Per Foot
TOP SIDE PANEL
2 Required
3/4" Sheathing
Bend Down 90°
COVER, END PANEL
2 Required
Bend Down 90°
Bend Up 90°
COVER, TOP SIDE PANEL
2 Required
NOTE:
1. Cover is Symmetrical About Either Centerline
2. Sheet Metal Bends Shown in Section A-A
Metal Cover
Hinge
Gasket Seal
SECTION A-A
Bend Down 90°
COVER, TRAP DOOR
1 Required
COVER, CATCHMENT BASIN
Dwg. 109



Outlet to Bld'g - 2" D. Elev. 74.5' - See Spec's and Section AA
17'-8"
14'-4"
3'-8"
1½" D. x 48" Lg. - 2 Req'd. 1½" NTP - Both Ends - S.S. See Spec's and Dwg, 25-3-2
Slope Sump
Slope Floor
15'-4"
13'-4"
12'
6'-8"
3'
6'
15'-8"
22'-8"
Bend Rods Around Manhole
Backfill to 77.5 Elev.
Manhole See Spec's
Manhole to Fit 3'D. Culvert See Spec's.
#4 ϕ at 12" x 100" Lg.
SECTION C-C
Detail of Side Reinforcing
#4 ϕ at 12" x 40" Lg.
1½" R. - On All # 4 ϕ Hooks at Edge of Floor Slab and Extend Back.
Copper Dam - 6" Wide
Shear Key See Spec's.
4 ϕ at 12" x 94" Lg.
#5 ϕ 12" x 156" Lg.
4 ϕ at 8" x 184" Lg.
Bevel - 1" x 45°
#5 ϕ at 12" x 125" Lg.
4 - # 4 ϕ at 10"
4 - # 4 ϕ at 6"
3 #6 ϕ at 6"
2 #6 ϕ at 5"
Overlap - 20" for # 4 Rod 30" for # 6 Rod and Wire Rods Together
SECTION B-B
Detail of Corner
Outlet to Bldg. Elev 74.5 - 2"D See Spec's.
4 ϕ at 12" x 206" Lg.
#4 ϕ at 12" x 242" Lg.
SECTION A-A
Detail of End Reinforcing
STORAGE TANK AND SUMP
Plan No. 25-3-1
Dwg. 110

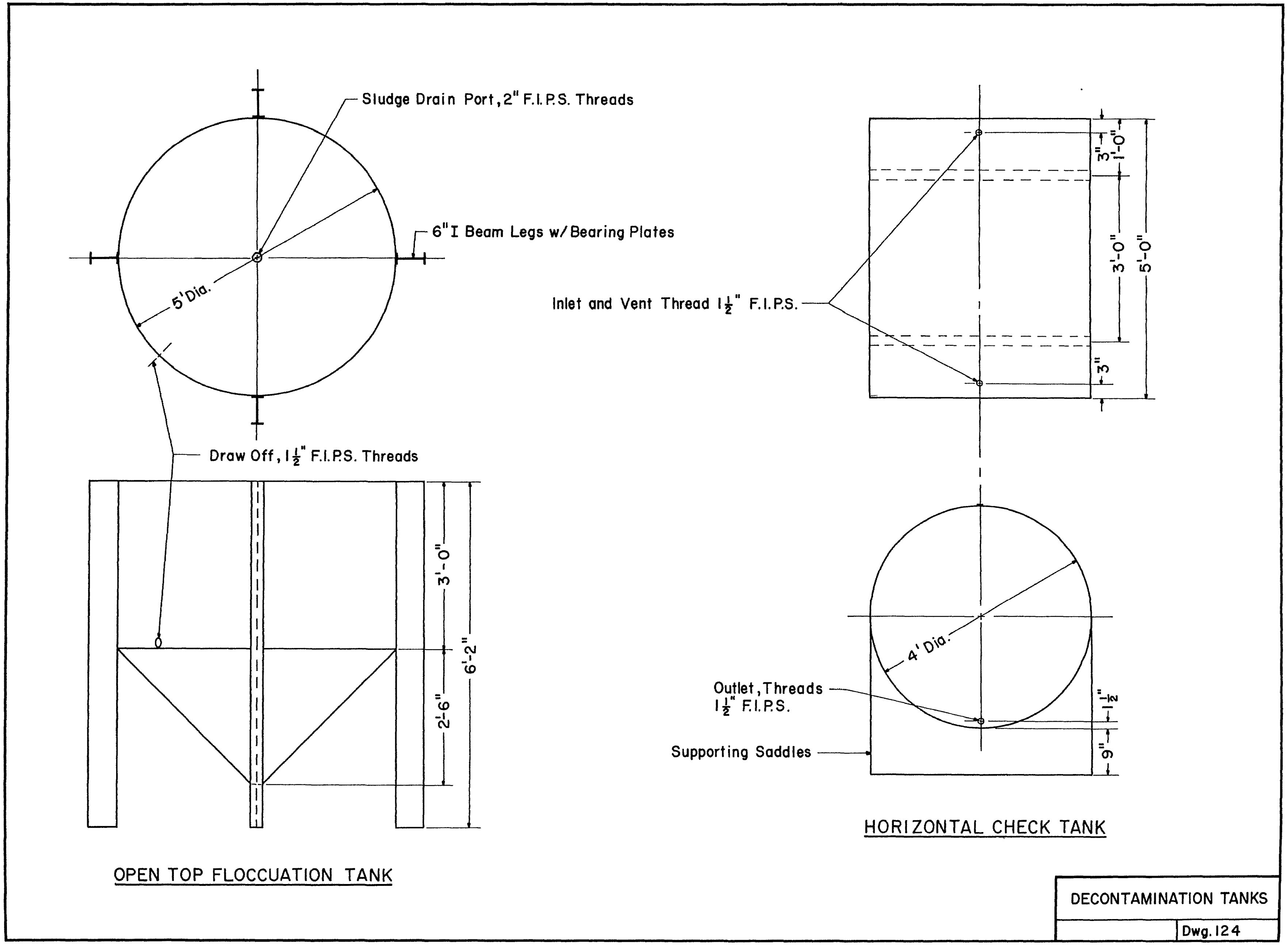

1"D. Conduit - Extend 6" from Wall - Elev. 76.5' See Spec's
4"D. Iron Sewer Pipe - Hub Plugged Elev. 74.5'- See Spec's
1½" D. x 48"Lg. Stainless Steel - 2 Pipes Elev. 76.5' (Connect Sump and Storage Unit)
2"D.x 14"Lg. Stainless Steel Pipe - Extend 6" Outside Wall, Threaded and Capped 4 Pipes Spaced as Shown - Elev. 73.5' (Inlets from Catchment Basin, See Spec's)
3"
6"
2'
4"
6'
3'
2'
4"
3'
Manhole Culvert - See Specs
Elev. 77.5
Elev. 76.5
To Pump
24"
Elev. 74.5
12"
Elev. 73.5
3'D.- # 12 Ga. Galv. Steel Culvert 3' Lg. Sections to be Welded Together in Field
8'-6"
4'-6"
2"
10"
Raised Platform for Reserve Pump
Culvert Sunk 3" into Floor Slab
SUMP DETAIL
Plan No. 25-3-2
Dwg. 111

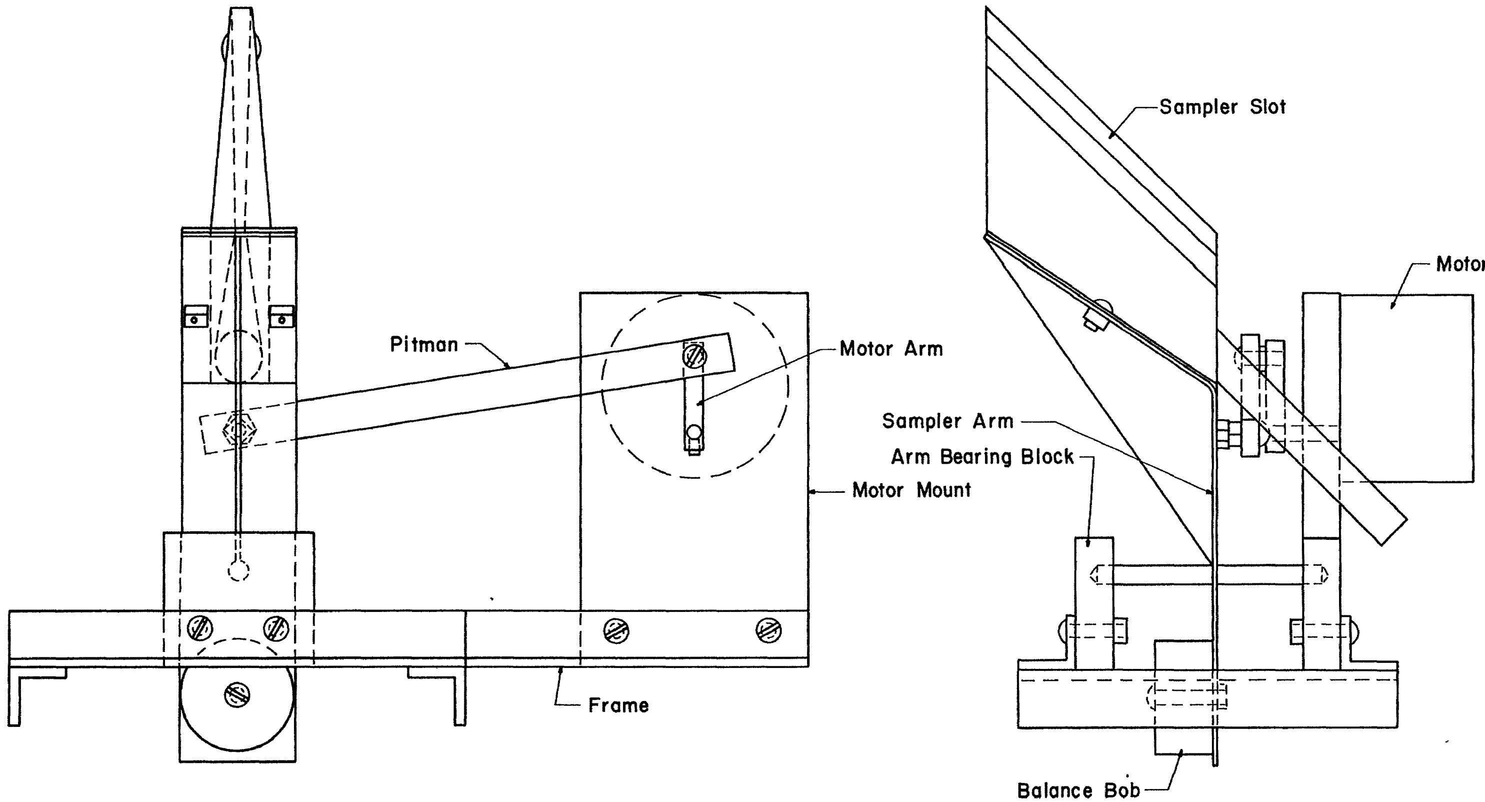


DOOR AND WINDOW SCHEDULE

"A"- 8'x9' Overhead Door
"B"- 2'-6"x 4'-8" Protected Window
"C"- 3'x 7' Access Door
"D"- 2'-6"x 7' Access Door

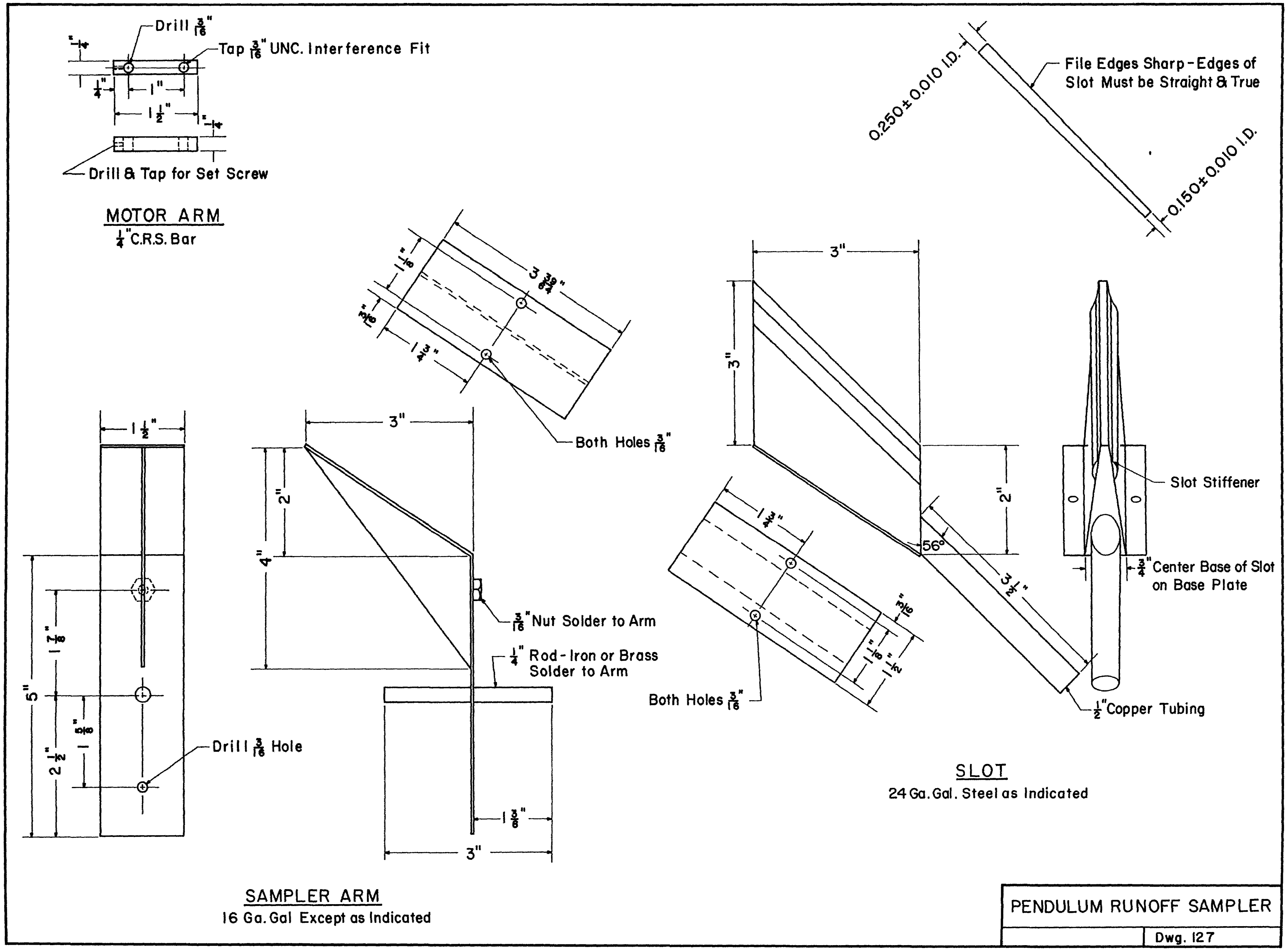
DECONTAMINATION FACILITIES	
Plan No. 20-2-1	Dwg. 114


Sludge Drain Port, 2" F.I.P.S. Threads
6" I Beam Legs w/ Bearing Plates
5' Dia.
Draw Off, 1½" F.I.P.S. Threads
3'-0"
6'-2"
2'-6"
OPEN TOP FLOCCUATION TANK
Inlet and Vent Thread 1½" F.I.P.S.
3"
1'-0"
3'-0"
5'-0"
3"
4' Dia.
Outlet, Threads
1½" F.I.P.S.
Supporting Saddles
1½"
9"
HORIZONTAL CHECK TANK
DECONTAMINATION TANKS
Dwg. 124

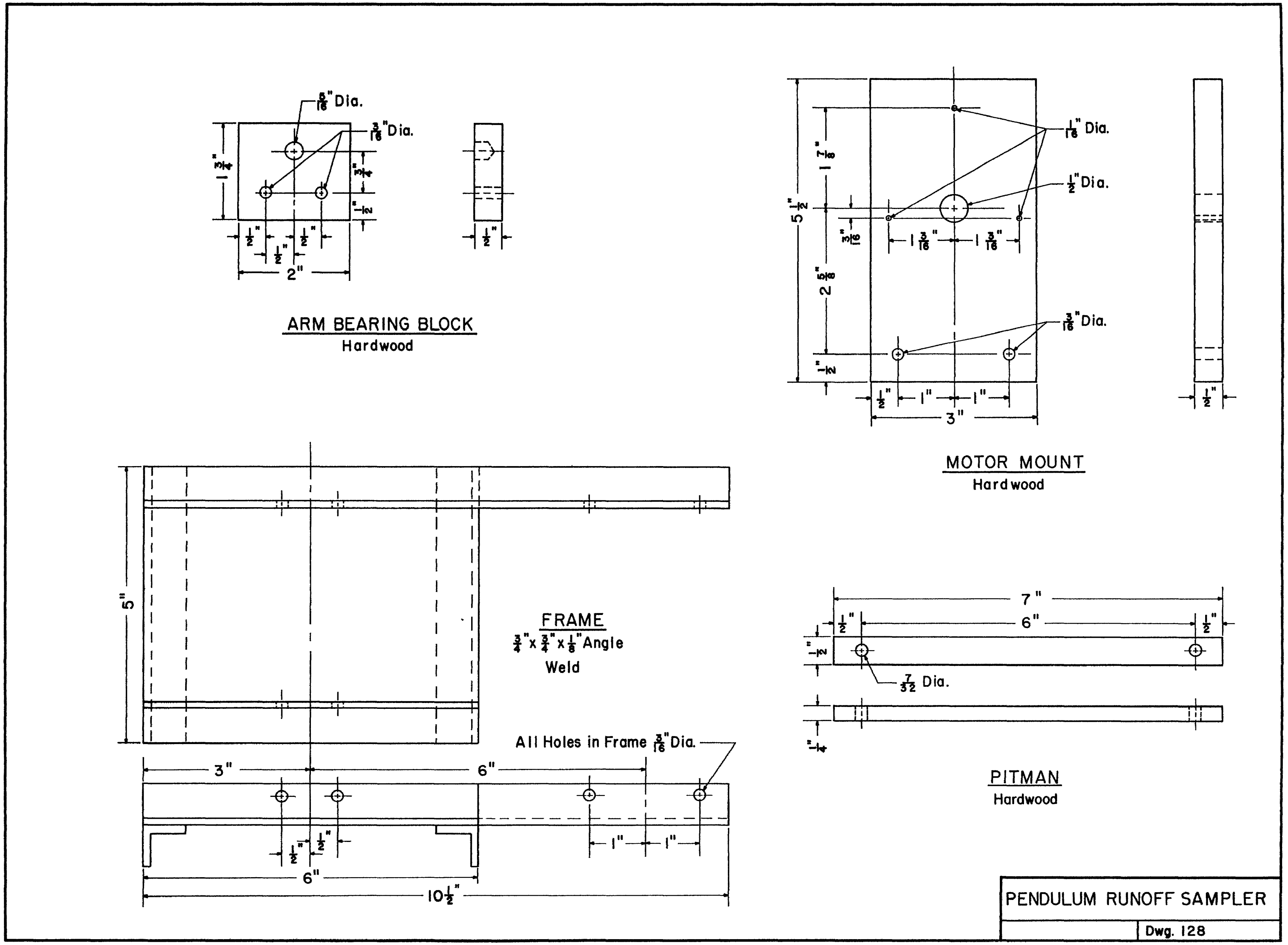


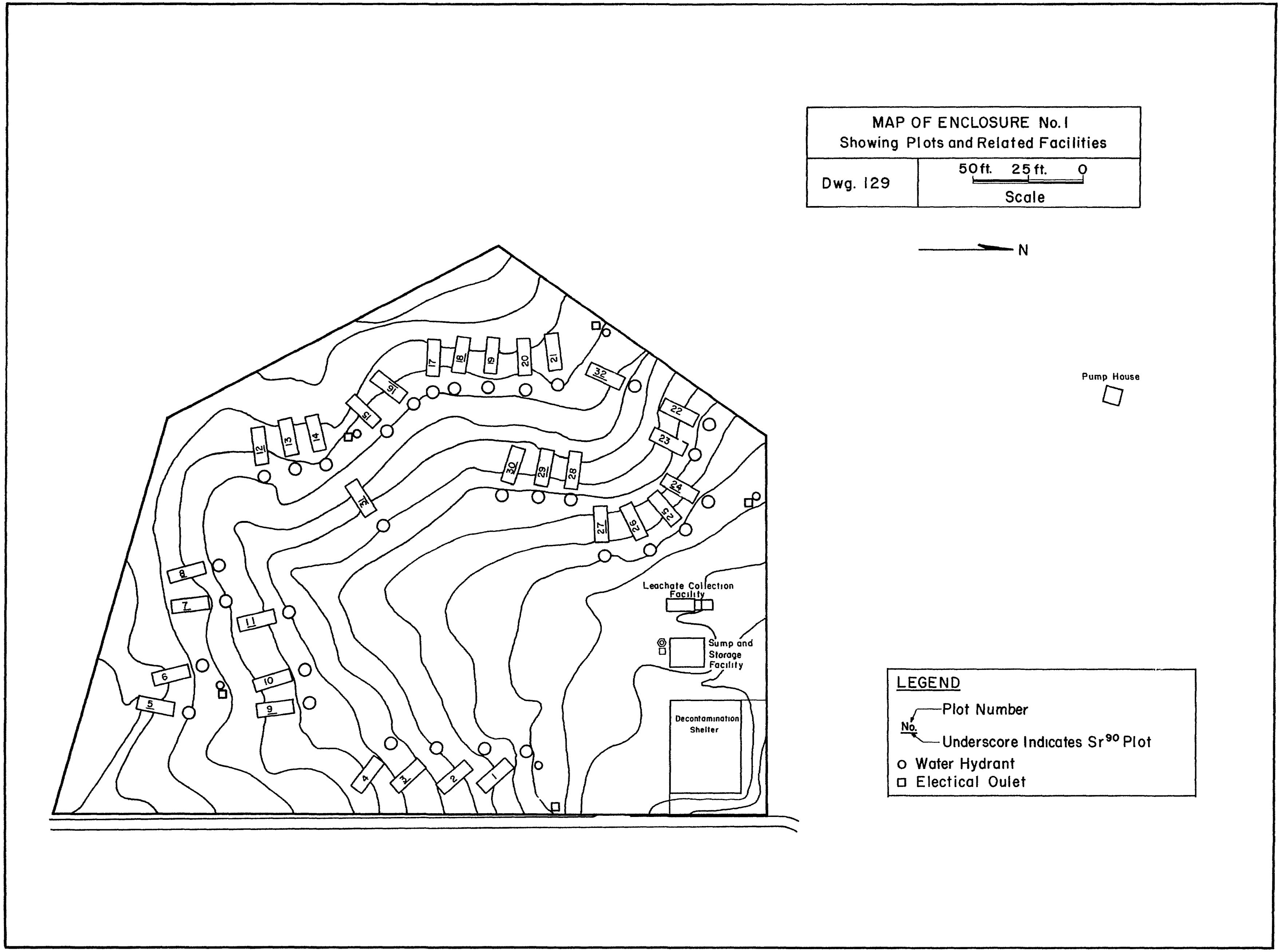
PENDULUM RUNOFF SAMPLER

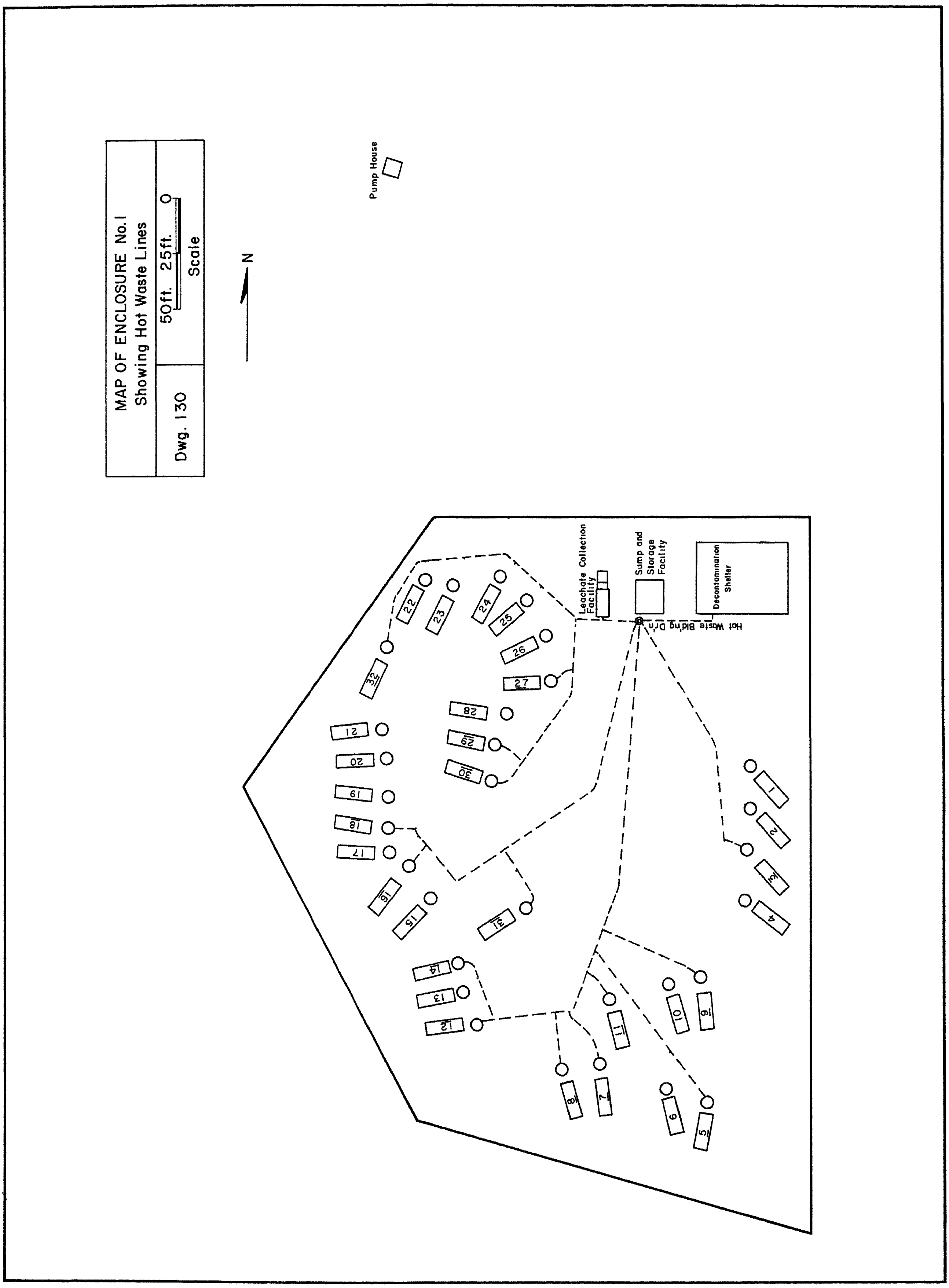
Dwg. 126

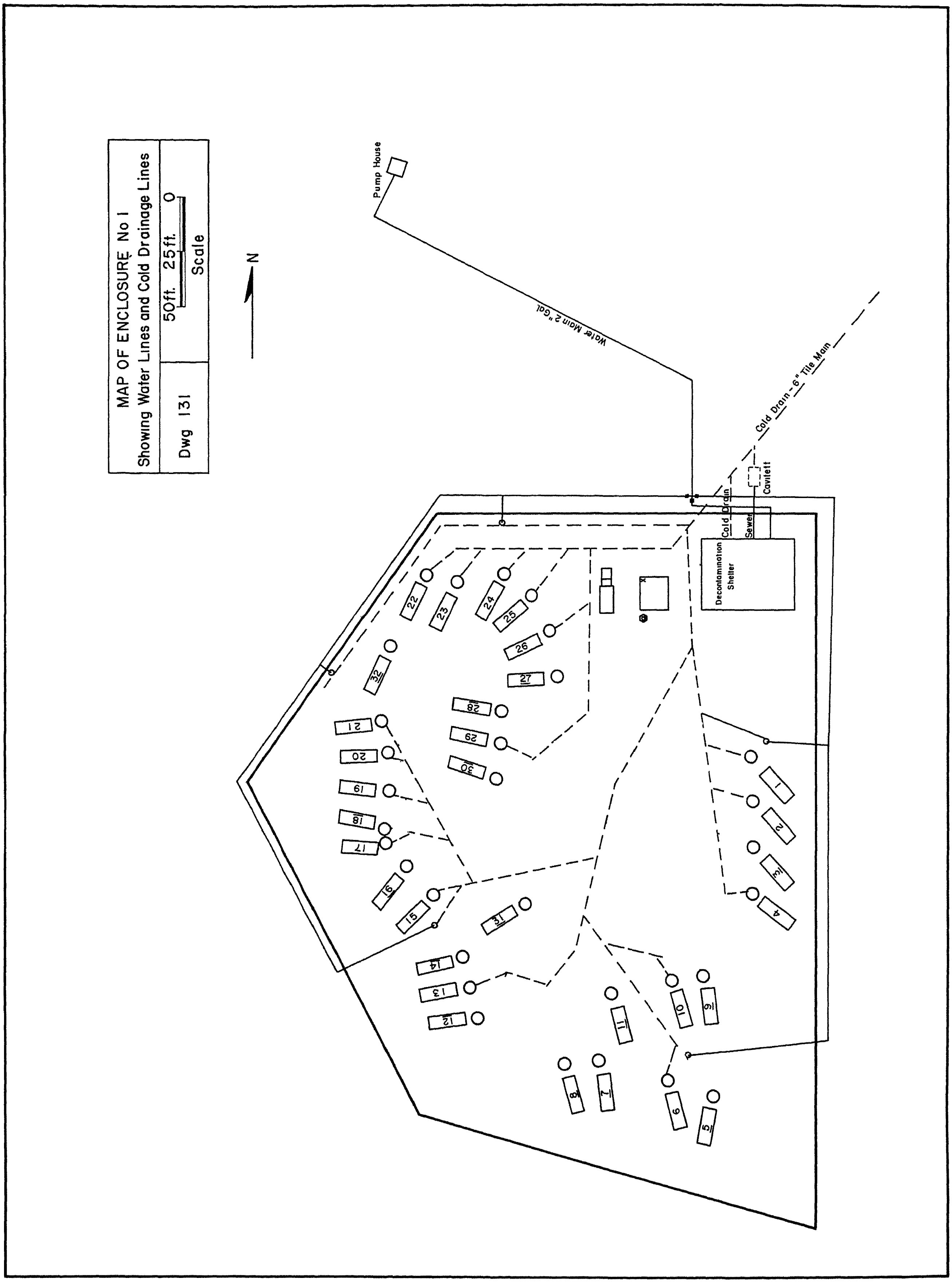


Drill 3/16"
Tap 3/16" UNC. Interference Fit
1/4"
1"
1 1/2"
Drill & Tap for Set Screw
MOTOR ARM
1/4" C.R.S. Bar
3 39/64"
1 1/8"
3/16"
1 3/4"
Both Holes 3/16"
1 1/2"
3"
2"
4"
5"
1 7/8"
2 1/2"
1 5/8"
Drill 3/16 Hole
3/16" Nut Solder to Arm
1/4" Rod - Iron or Brass Solder to Arm
1 3/8"
3"
SAMPLER ARM
16 Ga. Gal Except as Indicated
0.250±0.010 I.D.
File Edges Sharp - Edges of Slot Must be Straight & True
0.150±0.010 I.D.
3"
3"
2"
56°
3 1/2"
1 3/4"
3/16"
1 1/8"
1 1/2"
Both Holes 3/16"
Slot Stiffener
3/4" Center Base of Slot on Base Plate
1/2" Copper Tubing
SLOT
24 Ga. Gal. Steel as Indicated
PENDULUM RUNOFF SAMPLER
Dwg. 127


5/16" Dia.
3/16" Dia.
1 3/4"
3/4"
1/2"
1/2"
1/2"
1/2"
2"
1/2"
ARM BEARING BLOCK
Hardwood
1/16" Dia.
1/2" Dia.
3/16" Dia.
5 1/2"
1 7/8"
3/16"
1 3/16"
1 3/16"
2 5/8"
1/2"
1/2"
1"
1"
3"
1/2"
MOTOR MOUNT
Hardwood
5"
FRAME
3/4" x 3/4" x 1/8" Angle
Weld
All Holes in Frame 3/16" Dia.
3"
6"
1/2"
1/2"
1"
1"
6"
10 1/2"
7"
1/2"
6"
1/2"
1/2"
7/32 Dia.
1/4"
PITMAN
Hardwood
PENDULUM RUNOFF SAMPLER
Dwg. 128

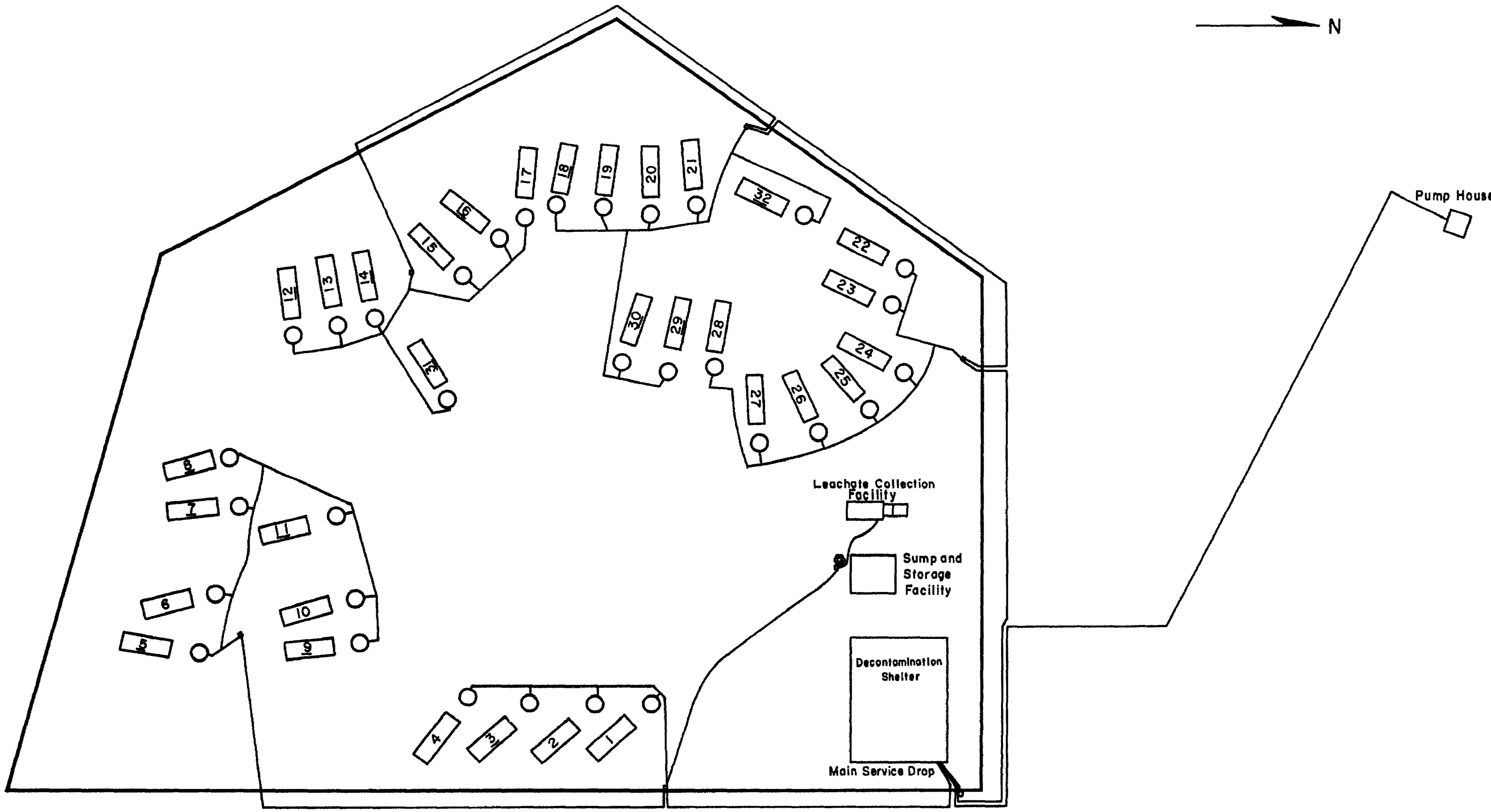

MAP OF ENCLOSURE No. I
Showing Plots and Related Facilities
Dwg. 129
50 ft. 25 ft. 0
Scale
N
Pump House
Leachate Collection Facility
Sump and Storage Facility
Decontamination Shelter
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
LEGEND
Plot Number
No.
Underscore Indicates Sr90 Plot
o Water Hydrant
□ Electical Oulet

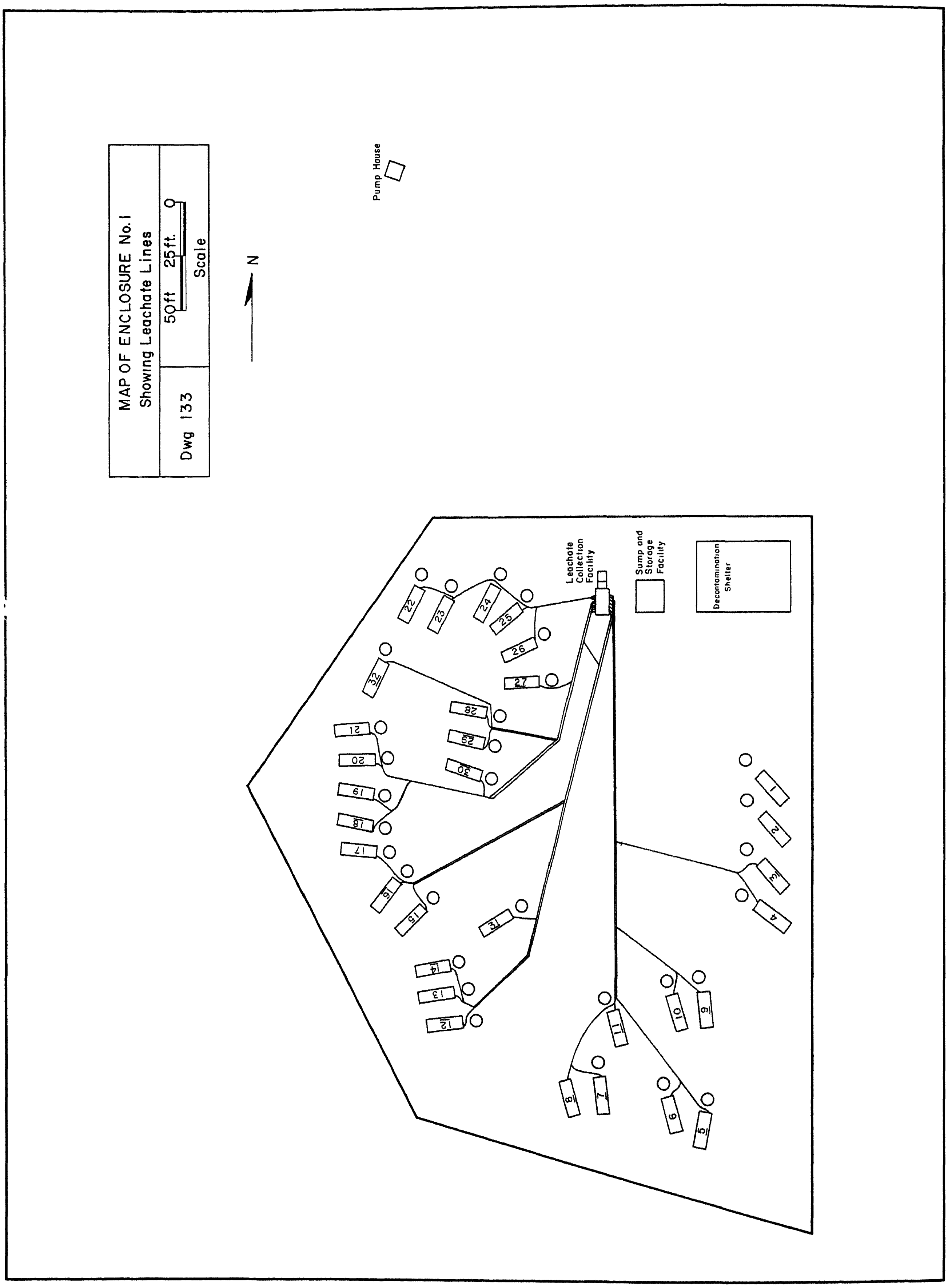

MAP OF ENCLOSURE No. 1
Showing Hot Waste Lines
Dwg. 130
50ft. 25ft. 0
Scale
N
Pump House
Leachate Collection Facility
Sump and Storage Facility
Decontamination Shelter
Hot Waste Bld'ng Dr'n
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32


MAP OF ENCLOSURE No I
Showing Water Lines and Cold Drainage Lines
Dwg 131
50ft. 25ft. 0
Scale
N
Pump House
Water Main 2" Gal
Cold Drain-6" Tile Main
Cavitett
Cold Drain
Sewer
Decontamination Shelter
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32

MAP OF ENCLOSURE No. I
Showing Electric Lines

Dwg. 132	50ft. 25ft. 0 Scale




MAP OF ENCLOSURE No.1
Showing Leachate Lines
Dwg 133
50ft 25ft. 0
Scale
N
Pump House
Leachate Collection Facility
Sump and Storage Facility
Decontamination Shelter
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32